DRAFT ENVIRONMENTAL ASSESSMENT

South Kona Police Station

TMK: (3rd) 8-2-001:072 and 084
South Kona District, Hawai‘i Island, State of Hawai‘i

July 2010

Prepared for:

County of Hawai‘i
Department of Public Works
101 Pauahi Street
Hilo, Hawai‘i 96720

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PROPOSING/
APPROVING AGENCY:

County of Hawai‘i
Department of Public Works
101 Pauahi Street
Hilo, Hawai‘i 96720

CONSULTANTS:

Geometrician Associates LLC
PO Box 396
Hilo, HI 96721

CLASS OF ACTION:

Use of County Land
Use of County Funds

This document is prepared pursuant to:

The Hawai‘i Environmental Protection Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200, Hawai‘i Department of Health Administrative Rules (HAR).

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SUMMARY OF THE PROPOSED ACTION, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The Hawai‘i County Police Department proposes to construct a new South Kona Police Station in order to better serve the public and improve the efficiency of its operations. The new station will contain administrative offices, holding cells and other appurtenances. Construction and operation of the police station is expected to have no more than a minor and temporary effect on traffic. The site has no significant biological or cultural resources, and effects to archaeological features primarily associated with the modern house and coffee farm have been mitigated through data recovery. Several aspects of the proposed facility have the potential to produce noise, including the indoor pistol firing range, the air conditioning units, and the parking areas. The design has been developed in coordination with an acoustical consultant and mitigates much of the potential increase in noise. The firing range will have solid concrete floors, walls, and roof, with several layers of other materials that dampen sound, and will be located on the highway side of the property. The air conditioning equipment located on the roof will be enclosed in a structure and will have vibration springs and reducers. An emergency standby generator will be built partially underground with concrete walls in two directions. Although vehicles exiting and entering the facility will produce noise, just as they do currently, the parking area located nearest to adjacent homes will not be at the main entrance and is expected to be relatively quiet. The project will include landscaping to increase the attractiveness of the facility and provide a visual buffer with neighboring residences.

PART 1: PROJECT DESCRIPTION, PURPOSE AND NEED AND ENVIRONMENTAL ASSESSMENT PROCESS

1.1 Project Location and Description

The Hawai‘i County Police Department proposes to construct a new South Kona Police Station adjacent to the existing South Kona Police/Fire complex in Captain Cook order to better serve the public and improve the efficiency of its operations (Figures 1-4). The expansion would occur on properties identified by TMK 8-2-001:084, a previously graded property which houses the existing complex, and TMK 8-2-001:072, a vacant property acquired in 2008. As the building must cross property lines to fit on the site, the Police Department plans to apply for a variance from setback requirements prior to Plan Approval.

The new two-story building will contain administrative offices, holding cells for both adults and juveniles, and storage for evidence and general items (Figure 4). It will also contain conference rooms, a squad room, staff lounge, physical fitness room, sound-insulated indoor pistol firing range and men’s and women’s lockers, shower and toilet facilities. The facility has been designed to minimize noise. The floor of the firing range has been designed with layers of concrete planks, concrete topping, concrete finish floor, layers of plywood, and acoustical mat. In some areas there will also be a resiliently suspended ceiling hanging on spring isolation hangers. Interior walls will have ballistic tile over steel plate over steel studs, and the metal furring will be isolated from the concrete or masonry interior/exterior structural walls. These design features for ceilings, walls and floors will assist in reducing noise in all frequency bands to the minimum practical level. A standby emergency generator will be partially underground, with concrete walls facing noise-sensitive directions, which should direct sound mainly upwards during the very limited emergency instances when this generator will be in operation. The building will be designed for equivalency compliance with LEED Silver Rating for energy performance. The new police station will have about 67 to 70 new dedicated stalls, plus two impound vehicle parking stalls, in addition to the existing 87 parking stalls. The project will include perimeter fencing and landscaping to increase the attractiveness of the facility and provide a visual buffer with neighboring residences.

The new police station and associated site improvements will be designed in accordance with guidelines of the Americans with Disabilities Act (ADA) and the ADA Accessibility Guidelines for Buildings and Facilities (ADAAG).

It is expected that the facility design will be finalized by mid-2010, and construction will proceed when funding is available. Construction would take about 16 months, and the estimated cost at this time is $15 to $17 million, a figure which will be refined during final design.

Figure 1a
Island Location Map

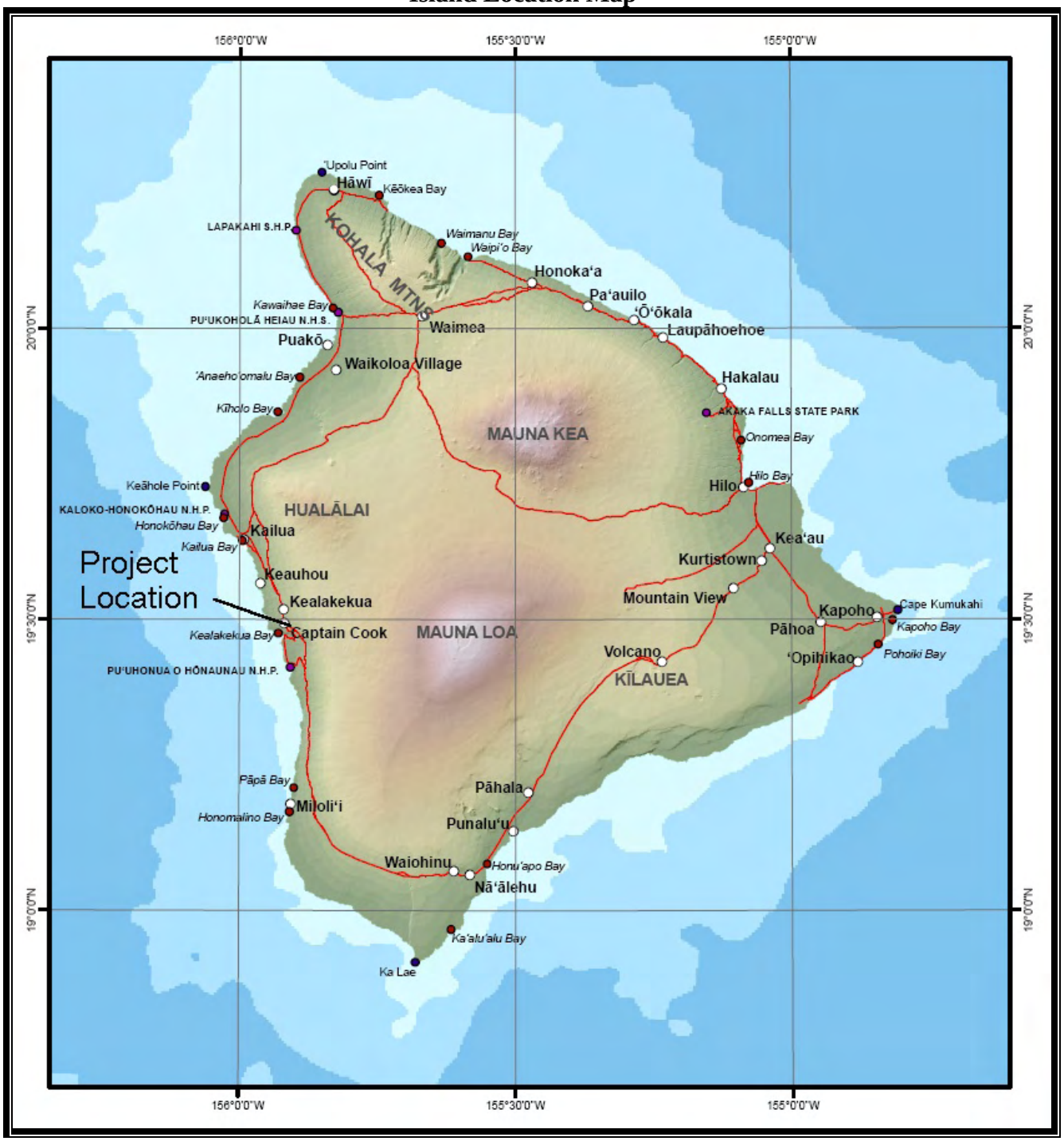
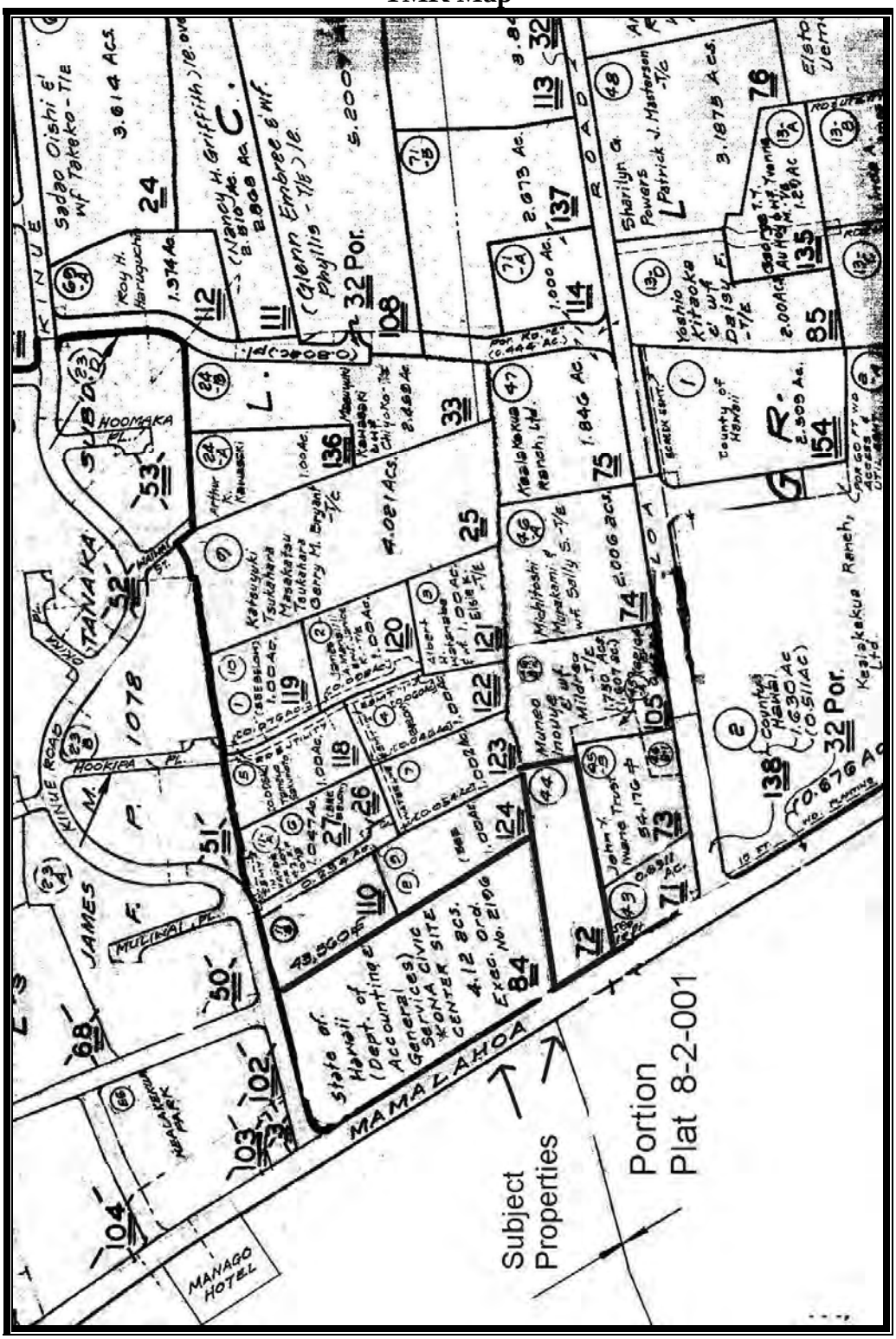


Figure 1b
Topographic Map

Figure 2
TMK Map



Source: Hawai‘i County Real Property Tax Maps. Some labels removed.

Figure 3
Project Site Photographs

3a Airphoto
Note: Neighboring Houses Are Symbolized with Green "H"

3b Frontage on Mamalahoa Highway ▲

▼ 3c View North from Interior of TMK 8-2-001:072 Over Existing Police Station

1.2 Purpose and Need

The Hawai‘i County Police Department is undertaking this project in order to better serve the public and improve the efficiency of its operations. Currently, many of the services needed in South Kona are only available at the regional police station in Kealakehe, which is 15 miles to the north, and some are only available in Hilo. The new station will have administrative offices and holding cells, both of which are required in South Kona. Dormitory space will continue to be housed in the existing sub-station located on parcel 084, which has a recently renovated barracks space.

There is no facility in all of West Hawai‘i that can accommodate the firearms training that all officers are required to have. Officers currently are obliged to travel to Hilo for firearms training, where an over-utilized 4-lane range exists. The new police station will have a 10-lane firing range and will support all West Hawai‘i officers, saving valuable time and money that would otherwise be expended on travel to Hilo.

1.3 Environmental Assessment Process

This Environmental Assessment (EA) process is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawai‘i Administrative Rules (HAR), is the basis for the environmental impact process in the State of Hawai‘i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria.

Part 4 of this document states the finding (anticipated finding, in the Draft EA) that no significant impacts are expected to occur; Part 5 lists each criterion and presents the findings (preliminary, for the Draft EA) for each made by the Hawai‘i County Department of Public Works, the proposing/ approving agency on behalf of the Hawai‘i County Police Department. If, after considering comments to the Draft EA, the agency concludes that, as anticipated, no significant impacts would be expected to occur, then the agency issues a Finding of No Significant Impact (FONSI), and the action is permitted to occur. If the agency concludes that significant impacts are expected to occur as a result of the proposed action, then an Environmental Impact Statement (EIS) is prepared.

1.4 Public Involvement and Agency Coordination

The following agencies and organizations were consulted in development of the environmental assessment:

State:

Department of Accounting and General Services
Department of Health
Department of Land and Natural Resources
Department of Transportation, Highways Division
Office of Hawaiian Affairs
State Historic Preservation Division (SHPD-DLNR)

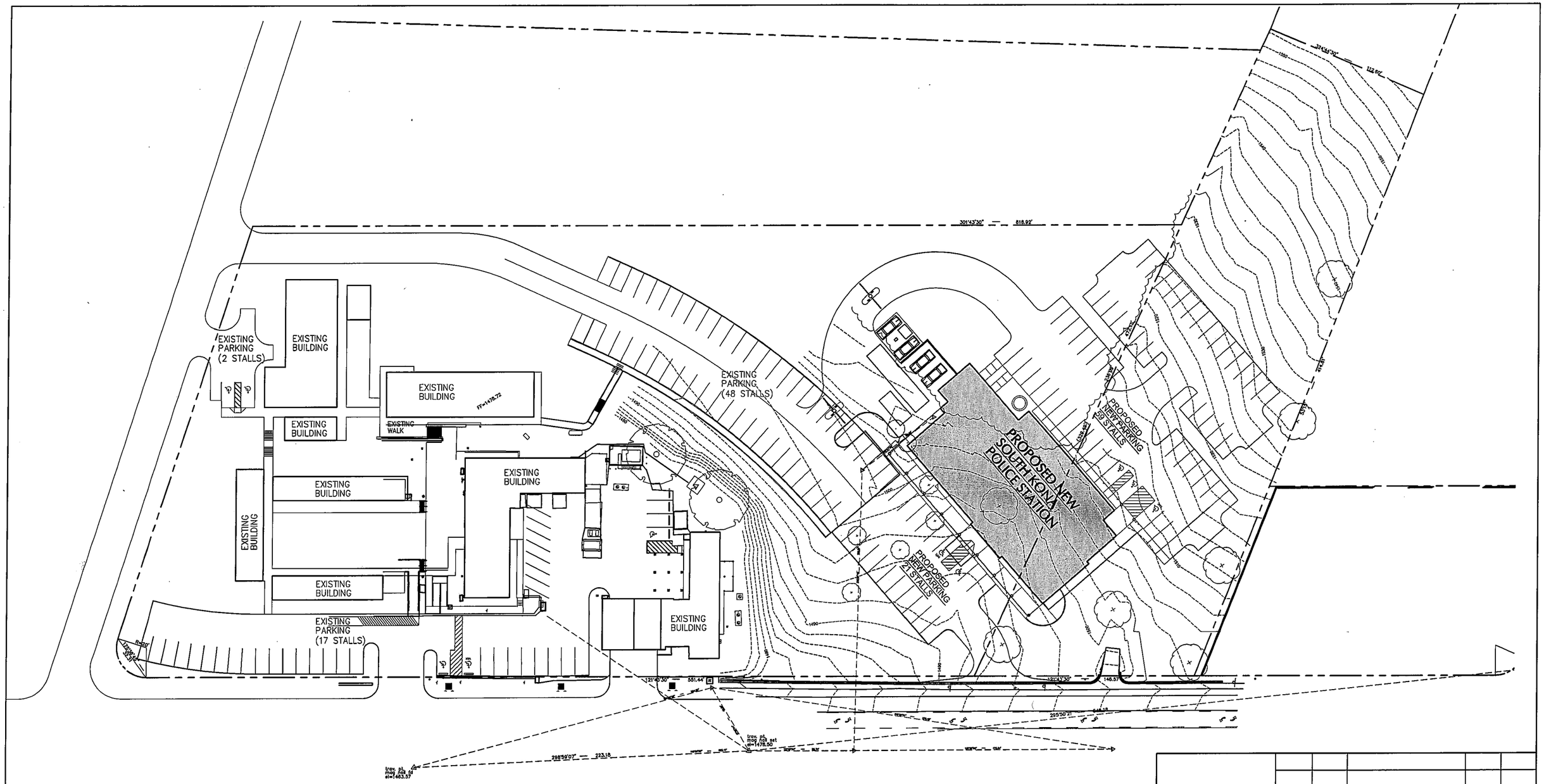
County:

County Councilwoman Brenda Ford
Civil Defense Agency
Department of Environmental Management
Planning Department

Private:

Sierra Club
Neighboring property owners

Copies of communications received during early consultation are contained in Appendix 1a.



NORTH

1 PROPOSED SITE PLAN

SCALE: 1/32"=1'

0 16' 32'

SCALE IN FEET

REVISION:	DATE:	DESCRIPTION:	MADE BY:	APPROVED:

COUNTY OF HAWAII
DEPT. OF PUBLIC WORKS – BUILDING DIVISION

SOUTH KONA POLICE STATION

JOB NO. B-3676

MAMALAHOA HIGHWAY
CAPT. COOK, SOUTH KONA, HAWAII

T.M.K.: (3) 8-2-001: 072 & 084

JOB NO.: 09021

FLEMING & Associates, LLC
557 Manono Street
Hilo, Hawaii

PROPOSED SITE PLAN

REVIEWED BY:

BUILDING DIVISION CHIEF
DEPT. OF PUBLIC WORKS
COUNTY OF HAWAII

DATE

DESIGNED BY: SF
DRAWN BY: SF
CHECKED BY: SF
DATE: 9-3-09

SHEET NO: A1

SCALE: 1" = 20'

PROPOSED CONCRETE RETAINING WALL

PROPOSED CONCRETE RETAINING WALL

414

55'15'

80

84

60

70

PROPOSED CONCRETE RETAINING WALL

PROPOSED SHALLOW DRYWELL (TYP OF 6)

PROPOSED FIRE HYDRANT

PROPOSED D.I. WATERLINE FOR ON-SITE FIRE HYDRANTS

50

PROPOSED STORM DRAIN PIPES TO ALLOW BLDG. DRAINS TO CONN.TO

30

40

PROPOSED STORM DRAIN PIPES TO ALLOW BLDG. DRAINS TO CONN.TO

PROPOSED CONCRETE WALKWAY

PROPOSED CURB RAMP

RELOCATED CONVAULT FUEL DISPENSING SYSTEM

42" HIGH GUARDRAIL FOR CONCRETE WALKWAY

PROPOSED CURB RAMP

CONN. TO BLDG. FIRE SPRINKLER SYSTEM DWG. BY OTHERS

OPTIONAL DRIVEWAY (EXIT ONLY)

PROPOSED NEW POLICE STATION

PROPOSED AREA FOR 12'x50' LOADING ZONE

PROPOSED AREA FOR 10'x22' LOADING ZONE

PROPOSED WATER METERS & BACKFLOW PREVENTERS

TO KA'U

APPROXIMATE LOCATION OF EXISTING 8" C.I. WATERLINE

CONN. TO BLDG. SEWER SEE MECH. DWG.

CONN. TO BLDG. SEWER SEE MECH. DWG.

CONN. TO BLDG. SEWER SEE MECH. DWG.

OIL-WATER SEPARATOR TANK PER MECH. DWG.

PROPOSED CONCRETE THRU GUTTER

CONN. TO BLDG. WATER SEE MECH. DWG.

PROPOSED SEPTIC LINE

VALVE BOX PER PER MECH. DWG.

PROPOSED COPPER WATERLINE FOR BUILDING

PROPOSED D.I. WATERLINE FOR BLDG. FIRE SPRINKLER

20

PROPOSED TRAFFIC-RATED SEPTIC TANKS

PROPOSED TRAFFIC-RATED ABSORPTION BED

MAMALAHOA HIGHWAY (HWY 11)

EXISTING PARKING LOT

1

10

PROPOSED D.I. WATERLINE FOR ON-SITE FIRE HYDRANTS

PROPOSED SHALLOW DRYWELL (TYP OF 6)

PROPOSED FIRE HYDRANT

TO KONA TOWN

LEGEND

PROPOSED NEW A.C. PAVEMENT

PROPOSED NEW CONCRETE

PRELIMINARY SITE PLAN

SCALE: 1"=20'

REVISION:	DATE:	DESCRIPTION:	MADE BY:	APPROVED:

COUNTY OF HAWAII
DEPT. OF PUBLIC WORKS - BUILDING DIVISION

SOUTH KONA POLICE STATION
JOB NO. B- 3676
MAMALAHOA HIGHWAY
CAPT. COOK, SOUTH KONA, HAWAII
T.M.K.: (3) 8-2-001: 072 & 084

PRELIMINARY SITE PLAN

Engineering Partners, Inc.
Progressive Solutions
455 E.LANIKAULA STREET
HILO, HAWAII, 96720

REVIEWED BY:

BUILDING DIVISION CHIEF
DEPT. OF PUBLIC WORKS
COUNTY OF HAWAII

DATE

DESIGNED BY:	MJG
DRAWN BY:	MJG
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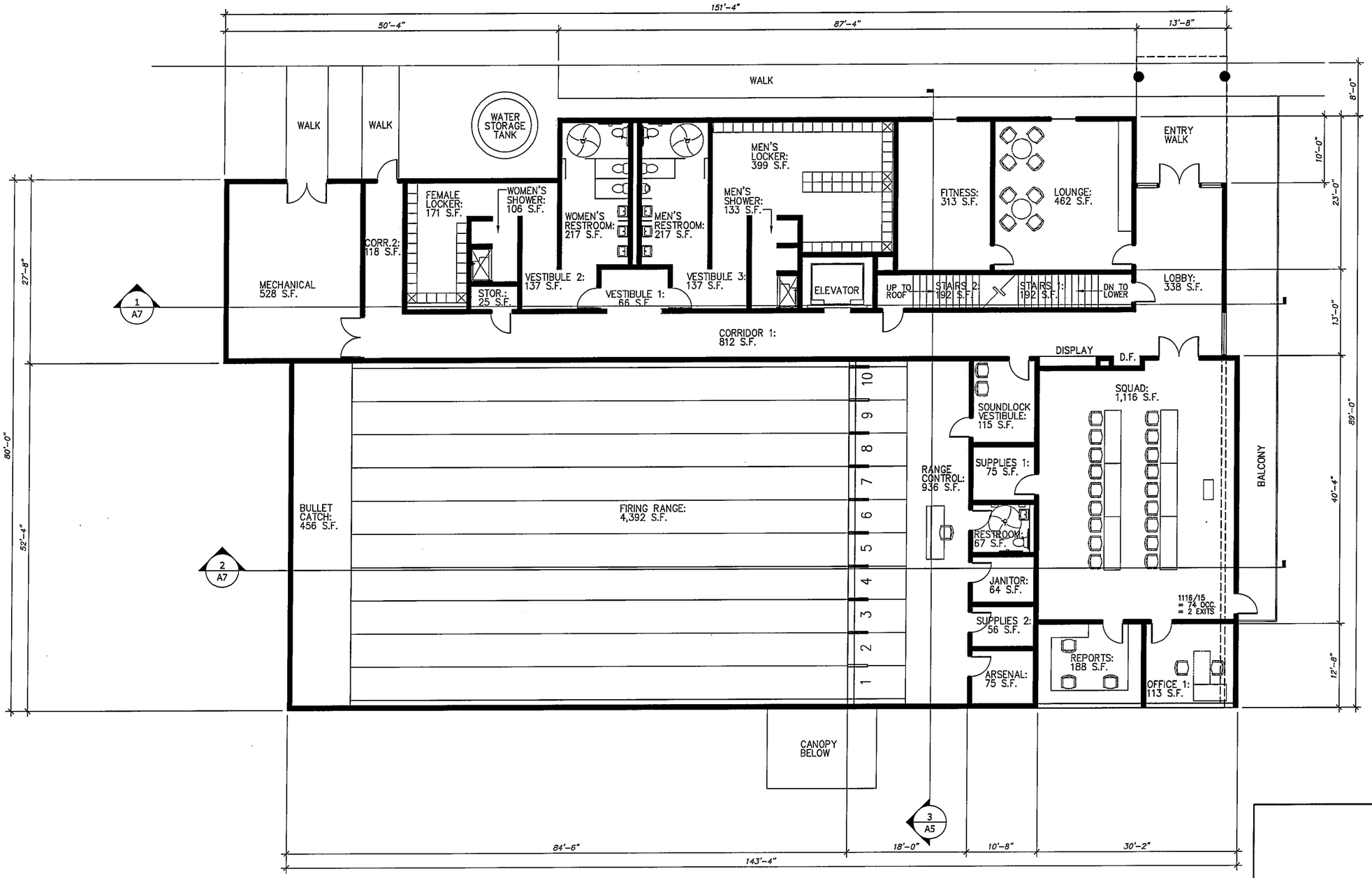
DATE:	10-28-09
SHEET NO:	C-2



AREA CALCULATIONS

UPPER FLOOR PLAN

ROOM NAME	ACTUAL AREA SQ. FT.	PROGRAM CRITERIA
ARSENAL	75	64
BULLET CATCH	456	500
CONFERENCE	0	256
CORRIDOR 1	812	-
CORRIDOR 2	118	-
FEMALE LOCKER	171	200
FIRING RANGE	4,392	2,500
MECHANICAL	528	600
JANITOR	64	25
LOBBY	338	- (CIRC)
LOUNGE	462	500
MALE LOCKER	399	500
MEN'S RESTROOM	217	250
MEN'S SHOWER	133	200
OFFICE 1	113	120
OFFICE 2	0	120
OFFICE 3	0	120
OFFICE 4	0	120
RANGE CONTROL	936	500
REPORTS 1	188	120
REPORTS 2	0	120
RESTROOM	67	128
SOUND LOCK VESTIBULE	115	-
SQUAD	1,116	1,200
STORAGE	25	-
SUPPLIES 1 (SQUAD)	75	-
SUPPLIES 2 (FIRING RANGE)	56	24
VESTIBULE 1	66	-
VESTIBULE 2	137	-
VESTIBULE 3	137	-
WOMEN'S RESTROOM	217	250
WOMEN'S SHOWER	106	100
MECHANICAL (FIRING RANGE)	0	200
JANITOR	0	50
STAIRS 2	192	-
ELEVATOR	88	-
FITNESS	313	-
TOTAL	0	0

UPPER LEVEL BUILDING AREA: 12,565 S.F.
LOWER LEVEL BUILDING AREA: 8,929 S.F.
TOTAL BUILDING AREA: 21,494 S.F.

1 UPPER LEVEL FLOOR PLAN

SCALE: 1/8"=1'

0 4' 8'
SCALE IN FEET

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SOUTH KONA POLICE STATION

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MAMALAHOA HIGHWAY
CAPT. COOK, SOUTH KONA, HAWAII
T.M.K.: (3) 8-2-001: 072 & 084

JOB NO.: 09021

FLEMING & Associates, LLC
557 Manono Street
Hilo, Hawaii

PROPOSED LOWER FLOOR PLAN

REVIEWED BY:

BUILDING DIVISION CHIEF
DEPT. OF PUBLIC WORKS
COUNTY OF HAWAII

DATE

DESIGNED BY: SF
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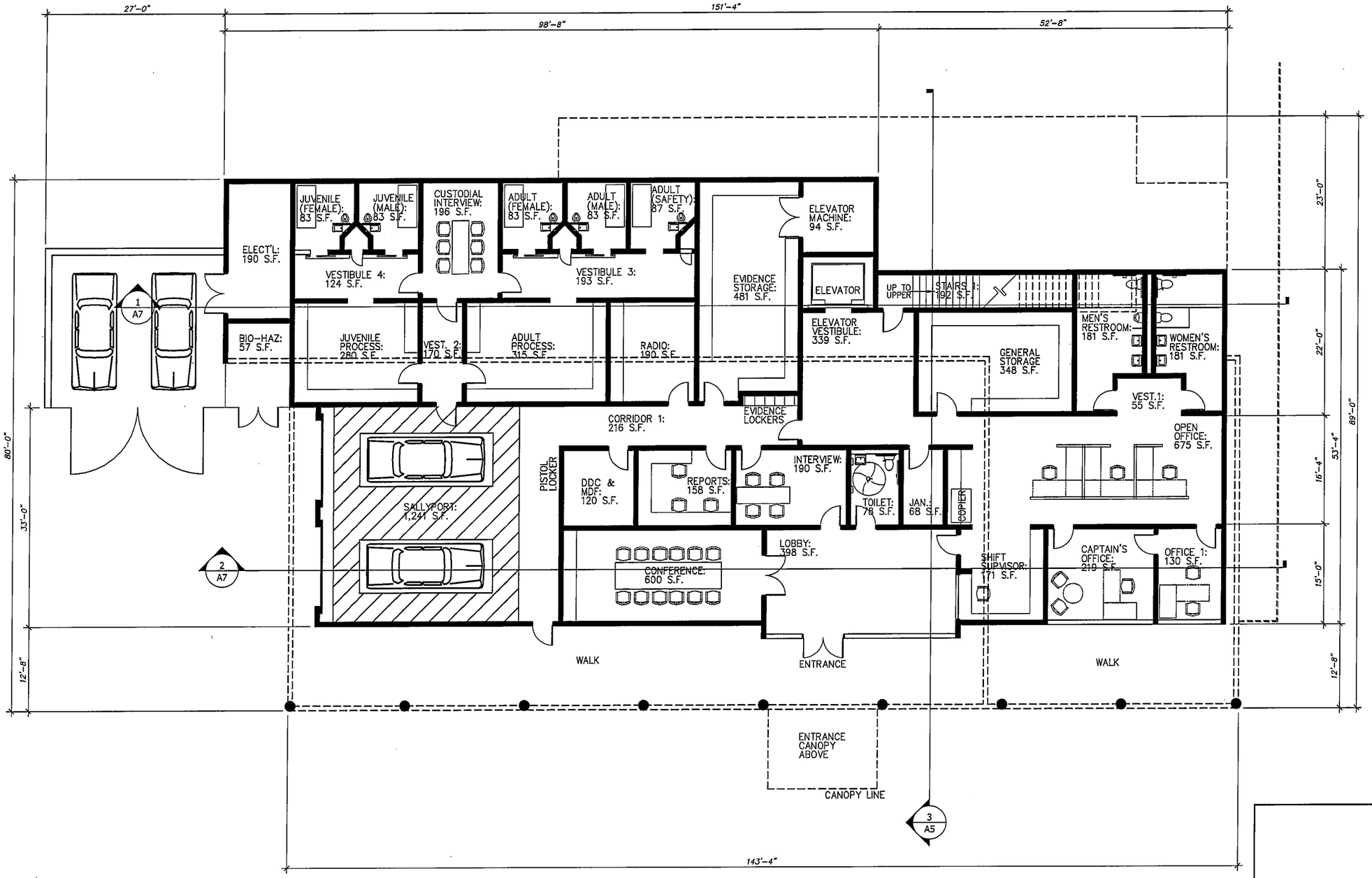

AREA CALCULATIONS		
LOWER FLOOR PLAN		
ROOM NAME	ACTUAL AREA SQ. FT.	PROGRAM CRITERIA
ADULT FEMALE	83	80
ADULT MALE	83	80
ADULT PROCESS	315	240
ADULT SAFETY	87	80
CAPTAIN'S OFFICE	219	120
CONFERENCE	600	600
CORRIDOR 1	216	-
ELECTRICAL	190	120
ELEVATOR MACHINE	94	-
EVIDENCE STORAGE	481	350
GENERAL STORAGE	348	400
INTERVIEW	190	120 (OFFICE)
JANITOR	68	50
JUVENILE FEMALE	83	80
JUVENILE MALE	83	80
JUVENILE PROCESS	280	240
LOBBY	398	450
DDC/MDF	120	120
MECHANICAL	0	600
MEN'S RESTROOM	181	200
OFFICE 1	130	120
OFFICE 2	0	120
OFFICE 3	0	120
OFFICE 4	0	120
OPEN OFFICE	675	1,000
TOILET	78	64
SALLYPORT	1188	1,500
SUPPLIES	0	120
VESTIBULE 1	55	-
VESTIBULE 2	170	-
VESTIBULE 3	193	-
VESTIBULE 4	124	-
WOMEN'S RESTROOM	181	200
RADIO	190	120
STAIRS 1	192	-
ELEVATOR	88	-
ELEVATOR VESTIBULE	339	-
SHIFT SUPERVISOR	171	-
BIO-HAZ	57	-
TOTAL	0	0

1 LOWER LEVEL FLOOR PLAN
SCALE: 1/8"=1'

0 4' 8'
SCALE IN FEET

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T.M.K.: (3) 8-2-001: 072 & 084

JOB NO.: 09021

FLEMING & Associates, LLC
557 Manono Street
Hilo, Hawaii

PROPOSED LOWER FLOOR PLAN

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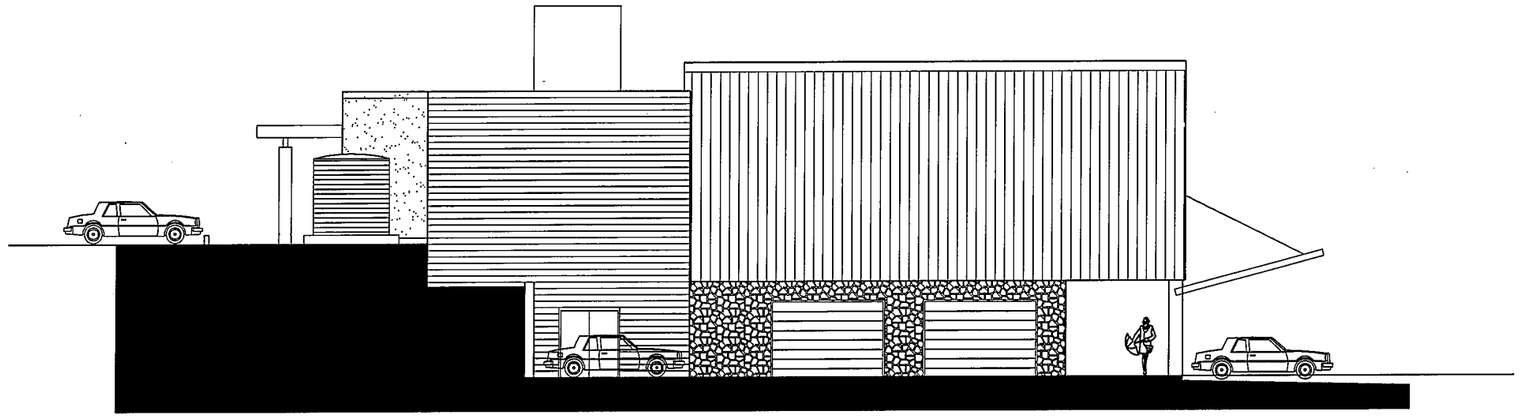

1 NORTH EXTERIOR ELEVATION
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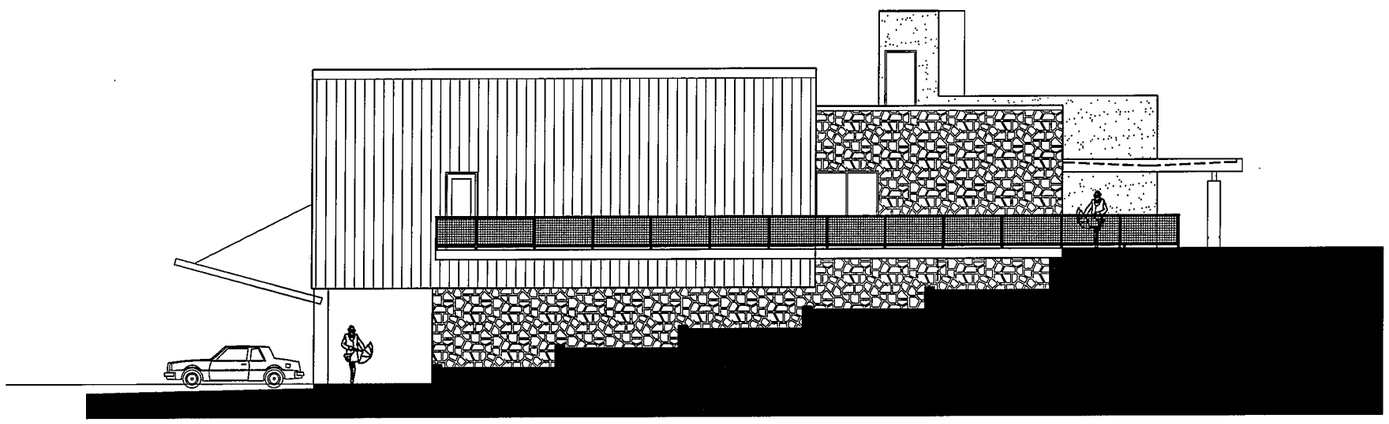
SCALE IN FEET



2 SOUTH EXTERIOR ELEVATION
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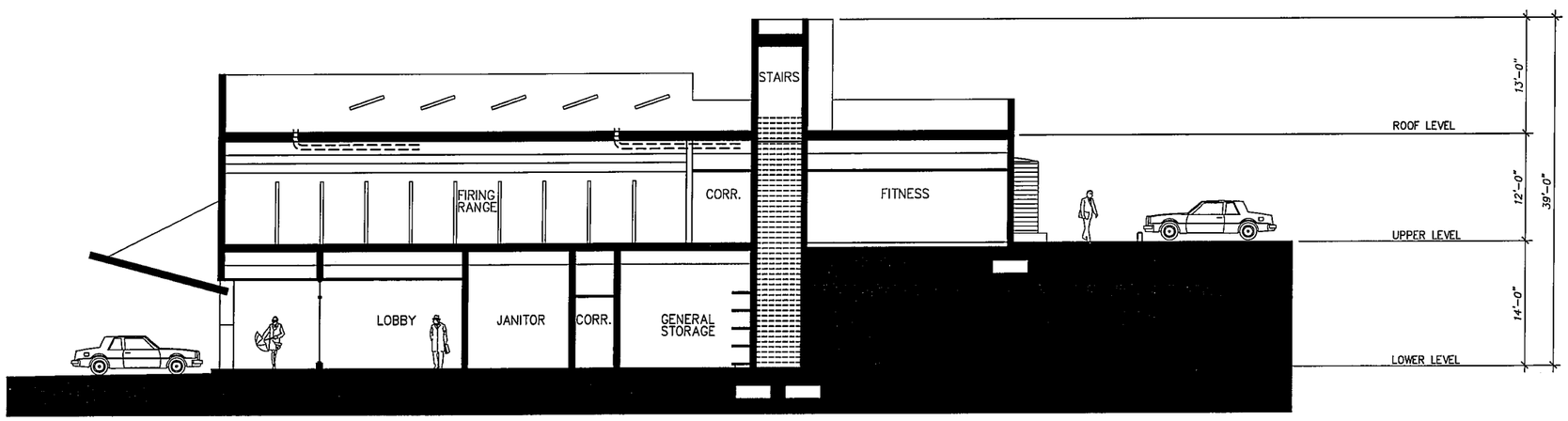
SCALE IN FEET



3 SECTION THRU BUILDING
SCALE: 1/8"=1'

0 4' 8'
SCALE IN FEET

JOB NO.: 09021

FLEMING & Associates, LLC
557 Manono Street
Hilo, Hawaii

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CAPT. COOK, SOUTH KONA, HAWAII
T.M.K.: (3) 8-2-001: 072 & 084

PROPOSED NORTH & SOUTH EXTERIOR ELEVATIONS,
PROPOSED SECTION THRU BUILDING

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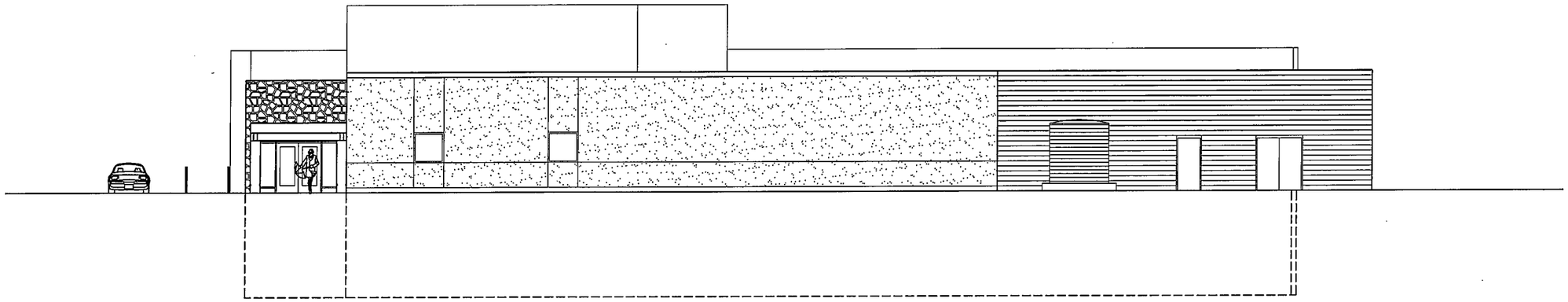

1 **EAST EXTERIOR ELEVATION**
SCALE: 1/8"=1'

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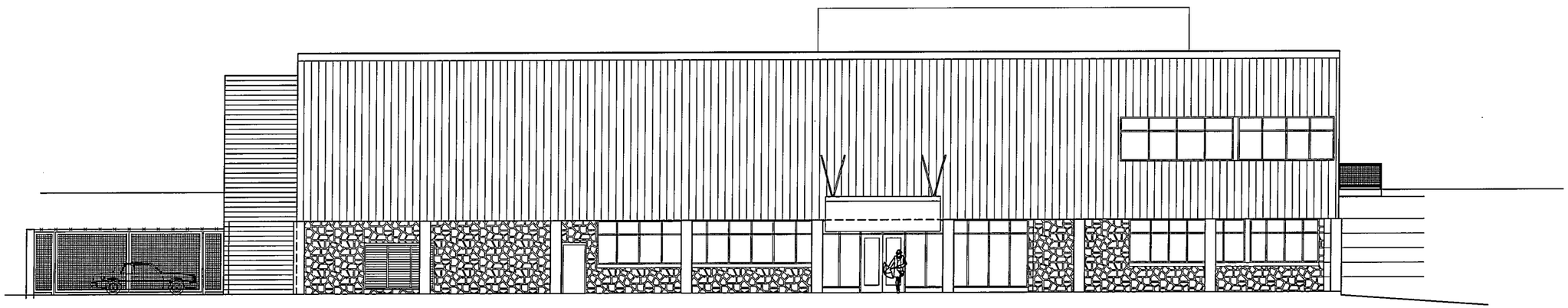
SCALE IN FEET



1 **WEST EXTERIOR ELEVATION**
SCALE: 1/8"=1'

0 4' 8'
SCALE IN FEET

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CAPT. COOK, SOUTH KONA, HAWAII
T.M.K.: (3) 8-2-001: 072 & 084

JOB NO.: 09021

FLEMING & Associates, LLC
557 Manono Street
Hilo, Hawaii

PROPOSED EAST & WEST EXTERIOR ELEVATIONS

REVIEWED BY:

BUILDING DIVISION CHIEF
DEPT. OF PUBLIC WORKS
COUNTY OF HAWAII

DATE

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DATE: 9-3-09

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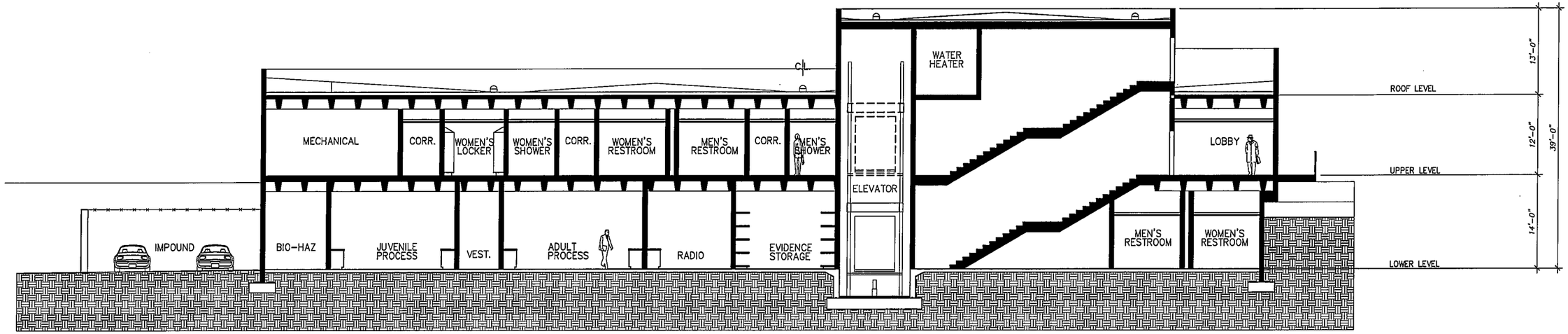
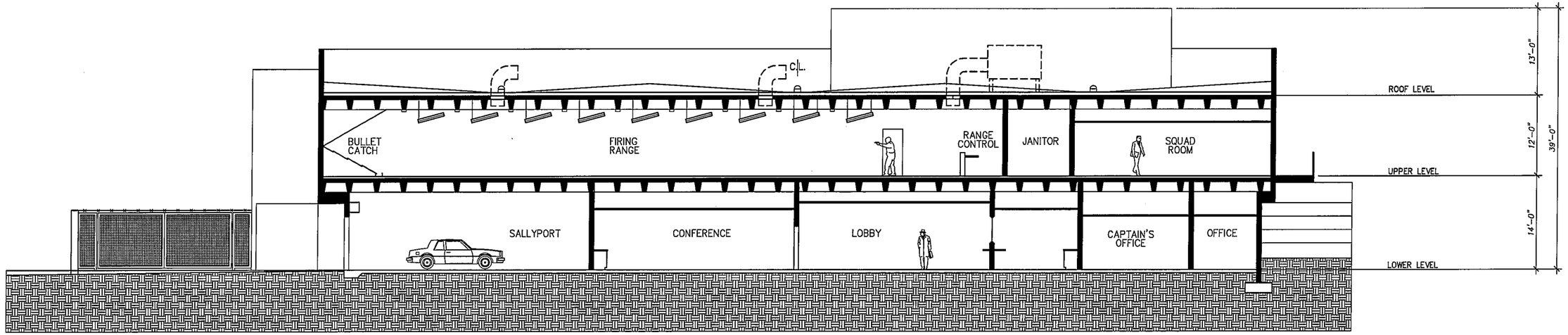


1 **SECTION THRU BUILDING**
SCALE: 1/8"=1'

0 4' 8'
SCALE IN FEET



2 **SECTION THRU BUILDING**
SCALE: 1/8"=1'

0 4' 8'
SCALE IN FEET

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CAPT. COOK, SOUTH KONA, HAWAII
T.M.K.: (3) 8-2-001: 072 & 084

JOB NO.: 09021

FLEMING & Associates, LLC
557 Manono Street
Hilo, Hawaii

PROPOSED SECTIONS THRU BUILDING

REVIEWED BY:

BUILDING DIVISION CHIEF
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COUNTY OF HAWAII

DATE

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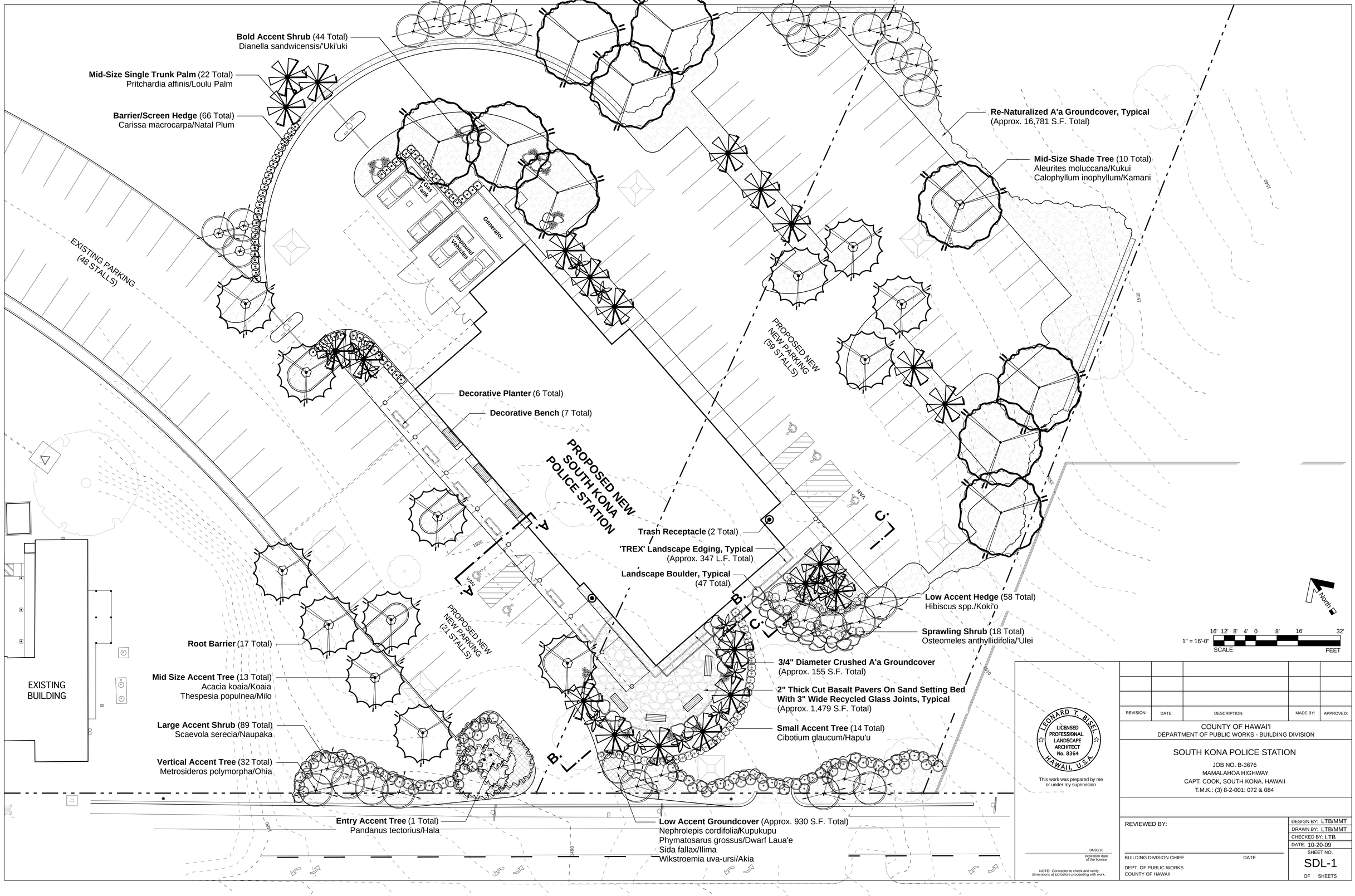


LEONARD T. BISEL
LICENSED PROFESSIONAL LANDSCAPE ARCHITECT
No. 8364
HAWAII, U.S.A.

This work was prepared by me or under my supervision

04/30/10
expiration date of the license

NOTE: Contractor to check and verify dimensions at job before proceeding with work.

REVISION:	DATE:	DESCRIPTION:	MADE BY:	APPROVED:

COUNTY OF HAWAI'I
DEPARTMENT OF PUBLIC WORKS - BUILDING DIVISION

SOUTH KONA POLICE STATION

JOB NO. B-3676
MAMALAHOA HIGHWAY
CAPT. COOK, SOUTH KONA, HAWAII
T.M.K.: (3) 8-2-001: 072 & 084

REVIEWED BY:

BUILDING DIVISION CHIEF DATE

DEPT. OF PUBLIC WORKS
COUNTY OF HAWAII

DESIGN BY: LTB/MMT
DRAWN BY: LTB/MMT
CHECKED BY: LTB
DATE: 10-20-09
SHEET NO.
SDL-1
OF SHEETS

PART 2: ALTERNATIVES

2.1 No Action

Under the No Action Alternative, the development of the new South Kona Police Station would not be undertaken. Neither the public nor the Police Department would benefit from the expansion and increased efficiency of the Police Department's services.

2.2 Alternative Locations or Strategies

The property identified as TMK 8-2-001:072 was acquired in 2008 specifically to provide some of the area need for the expansion of the South Kona Police Station. Only a few other County properties are available within several miles; most notable are the nearby County ballfield and Yano Hall (a community center). Utilizing these properties would have required displacing these uses to other sites that have not been identified. No other vacant non-County properties that were adjacent were available. Use of non-adjacent properties would have required a complete relocation of the police station facilities and would have been inefficient.

The County also considered restricting the building to the existing civic center property and demolishing or substantially altering the existing substation structure to allow a multi-story building. This alternative would have cost far more, and the existing site could not accommodate the additional required parking without also constructing multi-story parking facilities, which would have further expanded the project budget.

Although it is recognized that there are neighboring residential uses that require consideration in design and project activities, particularly in regard to visual and noise impacts, there do not appear to be severe environmental or other disadvantages associated with the particular proposed site. The property is well suited to the proposed use, and there are no apparent reasonable alternatives. Therefore, no alternative sites have been advanced in this Environmental Assessment.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Basic Geographic Setting

The County-controlled property upon which the new South Kona Police Station would be developed is referred to throughout this EA as the *project site*. The term *project area* is used to describe the general environs of this part of South Kona. The project site is located at approximately 1,500 feet in elevation in the community of Captain Cook, adjacent to Mamalahoa Highway at about the 110-mile marker.

The project site consists of two parcels, one of which (TMK 8-2-001:084) is a 4.12-acre lot owned by the State of Hawai‘i and put under County control through Executive Order 2196. It contains several State of Hawai‘i offices at the Kona Civic Center, as well as the South Kona Fire Station and the former South Kona Police Station. The South Kona Police Station was reduced to a substation when the new Kona Police Station was opened in Kealakehe in the 1990s, and later put to use as a police barracks. The other parcel (TMK 8-2-001:072) is a 1.259-acre lot acquired by Hawai‘i County in 2008. It is adjacent to and south of parcel 84 and was needed to provide a space large enough when combined with vacant space on parcel 84 to accommodate the construction of the new police station. Adjacent land use in the project area is agricultural, residential, recreational and commercial. A County park and recreational complex that includes Yano Hall is located adjacent to and northwest of the project site.

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

The climate in the area is mild, with an average maximum daily temperature of approximately 78 degrees F, an average minimum of 65 degrees, and annual rainfall averaging approximately 60 inches (U.H. Hilo-Geography 1998:57). Geologically, the site is located on the flanks of Mauna Loa volcano, and the surface consists of weathered basalt soils derived from Holocene-epoch (from 5,000 to 10,000 years old) lava flows (Wolfe and Morris 1996). Slopes on the project site are moderately steep in some areas. The project site soil is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) as Honaunau extremely rocky silty clay loam (HRD), a silty, organic, moderately well-drained soil that forms in ash over pahoehoe lava on 6 to 20 percent slopes. Roughly 40 percent of its surface is occupied by rock outcroppings. Permeability for this soil is moderate, runoff is medium, and erosion hazard slight. The Capability Subclass is IVe, and it is mainly used for pasturing, woodland, and wildlife areas (U.S. Soil Conservation Service 1973).

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the U.S. Geological Survey in this area of Kona is Zone 3, on a scale of ascending risk from 9 to 1 (Heliker 1990:23). The high hazard risk is based on the fact that Mauna Loa is presently an active volcano. Volcanic hazard Zone 3 areas have had 1-5 percent of their land area covered by lava or ash flows since the year 1800, but are at lower risk than Zone 2 areas because of their greater distances from recently active vents and/or because the local topography makes it less likely that flows will cover these areas.

In terms of seismic risk, the entire Island of Hawaiʻi is rated Zone 4 Seismic Hazard (*Uniform Building Code, 1997 Edition*, Figure 16-2). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built, as the 6.7-magnitude quake of October 15, 2006, demonstrated. That earthquake, and a magnitude 6.0 aftershock, caused no damage to the project site. The project site does not appear to be subject to subsidence, landslides or other forms of mass wasting.

Impacts and Mitigation Measures

In general, geologic conditions impose no constraints on the proposed action, and the proposed project is not imprudent to construct. The design includes retaining walls in several locations to ensure slope stability (see Figure 4b). All design will take into account the soil setting, and the facility will be designed in accordance with regulations related to its seismic setting.

3.1.2 Drainage, Water Features and Water Quality

Existing Environment

The project area has no perennial surface water bodies and no known areas of local (non-stream related) flooding. The Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM) FM1551661156C (9/16/1988) shows that the project site is in Flood Zone X, outside of the 500-year floodplain (Figure 5a). Heavy rains on the impervious surfaces *mauka* (uphill) of Mamalahoa Highway can lead to occasional shallow inundation on the highway

Kealakekua Bay is celebrated for its excellent marine biota, including healthy coral-based ecosystems. Special protection to aquatic resources is provided in the Kealakekua Bay Marine Life Conservation District (MLCD), in which marine organisms and their habitat are protected, while still allowing the public the opportunity to view them in their natural setting. The project site is located more than a mile from Kealakekua Bay, at 1,500 feet in elevation (see Figure 1b). Runoff from the project site percolates into the ground on site or joins other drainage water from the project area (particularly Mamalahoa Highway) and travels in a drainage ditch across Mamalahoa Highway and Napoʻopoʻo Road before spreading out on property situated hundreds of feet in elevation above Kealakekua Bay and percolating through aerated rock.

The project area is situated above or *mauka* (uphill) of the Department of Health's Underground Injection Control (UIC) line, as shown in Figure 5b. For areas above the UIC line, the underlying aquifer is considered a drinking water source and only limited types of injection wells are allowed with more requirements and limitations. Below the UIC line, the underlying aquifer is not considered drinking water source and a wider variety of wells are allowed. In either area, injection wells require a UIC Permit or Permit Exemption.

Impacts and Mitigation Measure

Because of the limited scale of construction, and because the property is not within a FIRM flood zone and no sensitive water resources are located nearby, additional risks for flooding or impacts to water quality associated with the proposed action appear to be negligible. The project will be required to contain any increase in runoff due to the construction of impermeable surfaces onsite, in conformance with Chapter 27 of the Hawai‘i County Code, by directing runoff toward drywells (see Figure 4b), which will undergo the UIC permit process to ensure minimal impacts to water quality.

In order to minimize the potential for construction phase sedimentation and erosion, the contractor shall perform all earthwork and grading in conformance with Chapter 10, Erosion and Sediment Control, Hawai‘i County Code. No impacts to stream banks or stream waters will occur as none are present. The SWPPP shall describe the emplacement of a number of best management practices (BMPs) for the project. These BMPs may include, but would not be limited to, the following:

- Minimization of soil loss and erosion by revegetation and stabilization of slopes and disturbed areas of soil, possibly using hydromulch, geotextiles, or binding substances, as soon as possible after working;
- Minimization of sediment loss by emplacement of structural controls possibly including silt fences, gravel bags, sediment ponds, check dams, and other barriers in order to retard and prevent the loss of sediment from the site;
- Minimizing disturbance of soil during periods of heavy rain;
- Phasing of the project in order to disturb a minimum necessary area of soil at a particular time;
- Application of protective covers to soil and material stockpiles;
- Construction and use of a stabilized construction vehicle entrance, with designated vehicle wash area that discharges to a sediment pond;
- Washing of vehicles in the designated wash area before they egress the project site;
- Use of drip pans beneath vehicles not in use in order to trap vehicle fluids;
- Routine maintenance of BMPs by adequately trained personnel;
- Coordination of storm water BMPs and wind erosion BMPs whenever possible; and
- Cleanup and disposal at an approved site of significant leaks or spills, if they occur.

Figure 5a Flood Insurance Rate Map

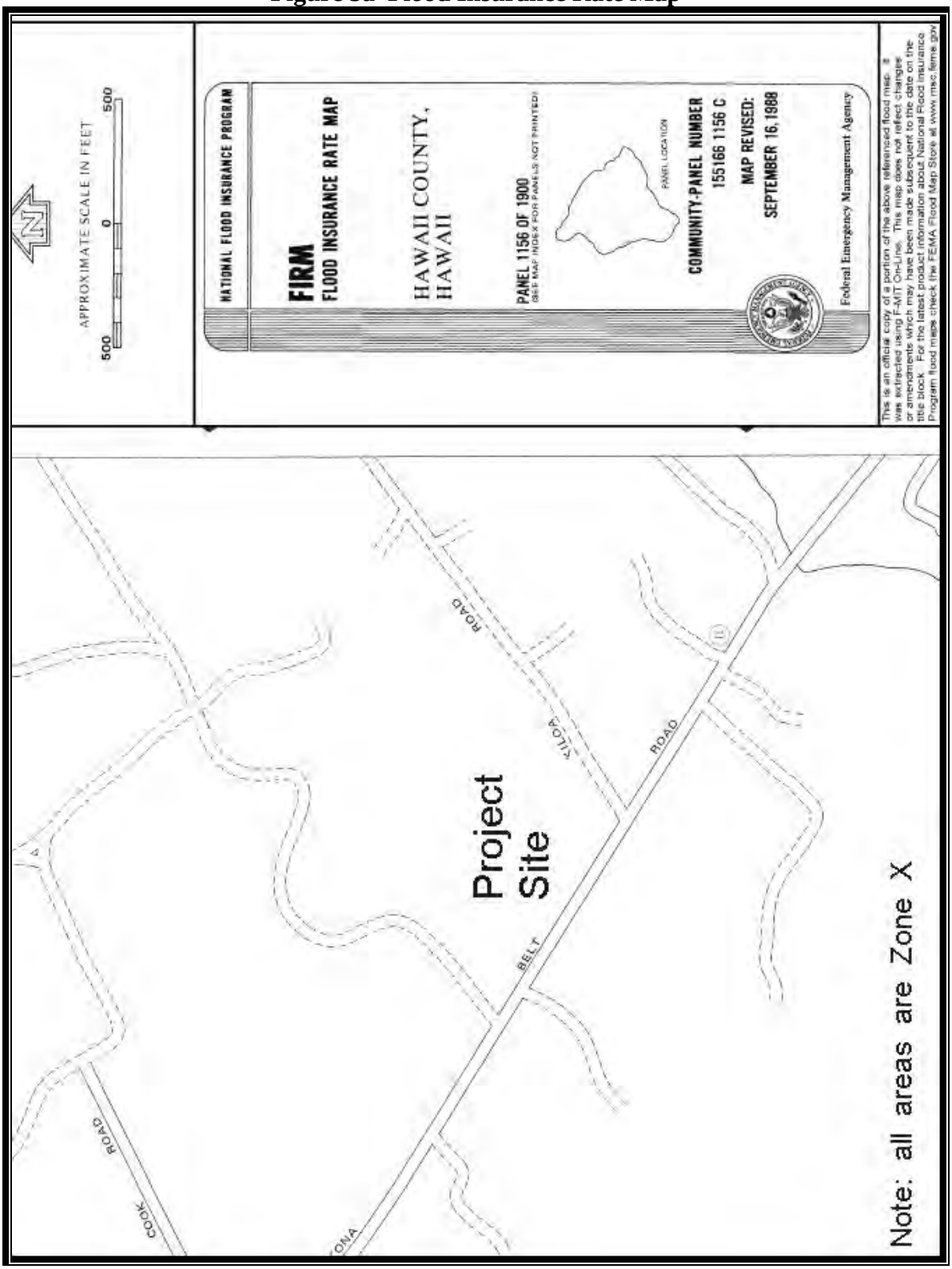
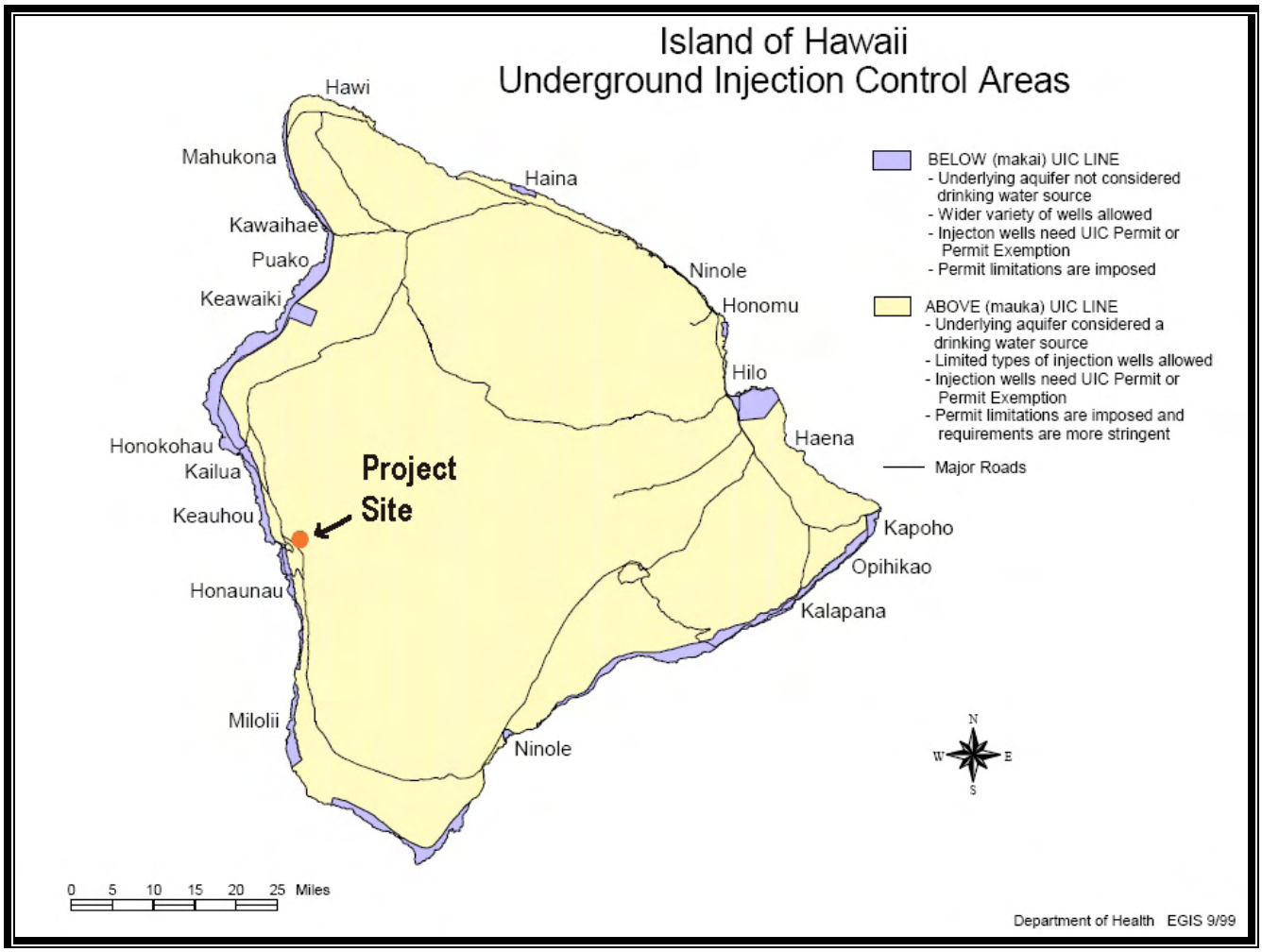


Figure 5b Island of Hawai‘i Underground Injection Control Areas



3.1.3 Flora, Fauna and Ecosystems

Existing Environment, Impacts and Mitigation Measures

The natural vegetation of this part of South Kona was most likely mesic forest dominated by *‘ohi‘a* (*Metrosideros polymorpha*) and *koa* (*Acacia koa)* (Gagne and Cuddihy 1990). These original communities, however, have been altered by traditional Hawaiian cultivation and later agriculture and urban uses. The vegetation of the project area is now mainly managed vegetation in the form of commercial and residential landscaping and farms, interspersed with patches of weeds.

A botanical reconnaissance of the project site was performed in August 2009 by Ron Terry of Geometrician Associates. The species list (Table 1) includes a number of cultivated and ornamental species. Several common native plant species were found. No rare, threatened or endangered native species were present or would be expected in this formerly agricultural and highly disturbed site.

Table 1. Plant Species on Project Site

Scientific Name	Family	Common Name	Life Form	Status
Ageratum conyzoides	Asteraceae	Ageratum	Herb	A
Archontophoenix alexandrae	Arecaceae	Alexandra palm	Tree	A
Asparagus setaceus	Liliaceae	Asparagus fern	Shrub	A
Bidens alba	Asteraceae	Bidens	Herb	A
Brachiaria mutica	Poaceae	California grass	Herb	A
Carica papaya	Caricaceae	Papaya	Tree	A
Chamaesyce hirta	Euphorbiaceae	Garden spurge	Herb	A
Christella dentata	Thelypteridaceae	Cyclosorus	Fern	A
Clerodendrum chinense	Verbenaceae	Pikake honohono	Tree	A
Cocculus trilobus	Menispermaceae	Huehue	Vine	I
Codiaeum variegatum	Euphorbiaceae	Croton	Shrub	A
Coffea arabica	Rubiaceae	Coffee	Shrub	A
Commelina diffusa	Commelinaceae	Honohono	Herb	A
Cordyline fruticosa	Agavaceae	Ti	Shrub	A
Crotalaria sp.	Fabaceae	Rattlepod	Herb	A
Desmodium tortuosum	Fabaceae	Florida beggarweed	Herb	A
Desmodium triflorum	Fabaceae	Beggarweed	Herb	A
Dracaena fragrans	Agavaceae	Massangeana	Shrub	A
Dracaena marginata	Agavaceae	Money tree	Tree	A
Eleusine indica	Poaceae	Wire grass	Herb	A
Epipremnum aureum	Areaceae	Pothos vine	Vine	A
Euphorbia heterophylla	Euphorbiaceae	Kaliko	Herb	A
Ficus microcarpa	Moraceae	Chinese banyan	Tree	A
Ficus pumila	Moraceae	Creeping fig	Tree	A
Hedychium sp.	Zingiberaceae	Ginger	Herb	A
Hyptis pectinata	Lamiaceae	Comb hyptis	Shrub	A
Ipomoea indica	Convolvulaceae	Koali ‘awa	Vine	I
Jasminum spp.	Oleaceae	Jasmine	Shrub	A
Juniperus sp.	Cupressaceae	Juniper	Tree	A
Kyllinga brevifolia	Cyperaceae	Sedge	Herb	A
Macadamia integrifolia	Proteaceae	Macadamia	Tree	A
Mangifera indica	Anacardiaceae	Mango	Tree	A
Mimosa pudica	Fabaceae	Sensitive plant	Herb	A
Momordica charantia	Cucurbitaceae	Momordica	Vine	A
Monstera deliciosa	Araceae	Monstera	Vine	A
Musa x paradisiaca	Musaceae	Banana	Shrub	A
Panicum maximum	Poaceae	Guinea grass	Herb	A
Persea americana	Lauraceae	Avocado	Tree	A
Paspalum conjugatum	Poaceae	Hilo grass	Herb	A
Passiflora suberosa	Passifloraceae	Huehue haole	Vine	A
Physalis peruviana	Solanaceae	Poha	Shrub	A

Table 1, continued				
Scientific Name	**Family**	**Common Name**	**Life Form**	**Status**
Plumeria sp.	Apocynaceae	Plumeria	Shrub	A
Psidium cattleianum	Myrtaceae	Waiawi	Tree	A
Psidium guajava	Myrtaceae	Common guava	Tree	A
Psydrax odoratum	Rubiaceae	Alahe‘e	Tree	I
Pyracantha spp.	Rosaceae	Pyracantha	Shrub	A
Rivina humilis	Phytolaccaceae	Pokeweed	Shrub	A
Sansevieria trifasciata	Agavaceae	Mother-in-law’s tongue	Shrub	A
Schefflera actinophylla	Araliaceae	Octopus tree	Tree	A
Schinus terebinthifolius	Anacardiaceae	Christmas-berry	Shrub	A
Sechium edule	Cucurbitatceae	Chayote, pipinella	Vine	A
Setaria palmifolia	Poaceae	Palmgrass	Herb	A
Sida rhombifolia	Malvaceae	Cuba jute	Herb	A
Spathodea campanulata	Bignoniaceae	African tulip	Tree	A
Sporobolus africanus	Poaceae	Rattail grass	Herb	A
Strelitzia reginae	Strelitziaceae	Bird of paradise	Herb	A
Syngonium sp.	Araceae	Syngonium	Vine	A
Syzygium aromaticum	Myrtaceae	Clove	Tree	A
Syzygium malaccense	Myrtaceae	Mountain apple	Tree	A
Wedelia trilobata	Asteraceae	Wedelia	Herb	A

Notes: Alien (A), Endemic (E), and Indigenous (I)

Native birds including Hawaiian Hawks (*Buteo solitarius*) and Hawaiian hoary bats (*Lasiurus cinereus semotus*), both listed endangered species, are often seen even in this semi-urban area as well as most non-arid locations on the Big Island. However, the area lacks the tall native trees preferred by Hawaiian Hawks for nesting, and the dense, shrubby vegetation renders the area not highly suitable for Hawaiian hoary bats. As such, the project site would not be considered habitat for these species.

As with many areas of the Big Island, Captain Cook has a coqui problem. These non-native Caribbean frogs (*Eleutherodactylus coqui*) are present in far greater concentrations than in their Caribbean homeland because Hawai‘i lacks predators for the frog. They disrupt local ecosystems and also produce an extremely loud, shrill call at night that disturbs people. Because the project will reduce unused areas that are densely vegetated, the level of coqui infestation will be far less, but coqui will likely infest any new landscaping and periodic treatment would be necessary to eliminate the noise problem. This is an environmental problem throughout wetter parts of the island of Hawai‘i and mitigation cannot be accomplished in the context of one project.

Because of the lack of native ecosystems, or threatened or endangered plant species, no adverse impacts to biological resources would occur as a result of constructing or occupying the new police station facilities.

3.1.4 Air Quality, Noise and Scenic Resources

Environmental Setting

Air pollution in West Hawai‘i is mainly derived from volcanic emissions of sulfur dioxide, which convert into particulate sulfate and produce a volcanic haze (vog) that persistently blankets North and South Kona.

Noise on the project site is low to moderate and derived mainly from motor vehicles, with occasional higher levels of noise from residential and road maintenance activities, as well as noise from the existing police and fire station vehicles.

The project area does not contain any sites that are considered significant for their scenic character in the Hawai‘i County General Plan.

Impacts and Mitigation Measures

The proposed action will not measurably affect air quality or noise levels except minimally during grubbing, grading and construction. Removal of existing vegetation will be required. In order to minimize impacts from dust, the contractor will consult with the Department of Health (DOH) and, if required, will prepare a dust control plan compliant with provisions of Hawai‘i Administrative Rules, Chapter 11-60.1, “Air Pollution Control,” and Section 11-60.1-33, “Fugitive Dust.”

Construction would entail limited grading, compressors, vehicle and equipment engine operation. These activities may generate noise exceeding 95 decibels at times, impacting nearby noise sensitive receptors, including adjacent residences, the Kona Civic Center that is used for several State of Hawai‘i offices, the existing police and fire stations, Manago Hotel and Yano Hall. In cases where construction noise is expected to exceed the DOH “maximum permissible” property-line noise levels, contractors must obtain a permit per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH reviews the proposed activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers.

On an operational basis, several aspects of the proposed facility have the potential to produce noise, including the indoor pistol firing range, the air conditioning units, the emergency standby generator, and the parking areas. The design has been developed in coordination with an acoustical consultant to mitigate much of the potential increase in noise.

The firing range, which will have solid concrete floors, walls, and roof, is located on the highway side of the property, with intervening rooms between the range and the exterior wall facing the homes on the bordering *mauka* (uphill) properties. The floor will have 10-inch concrete planks with four inches of concrete topping. Above this will be four inches of concrete finish floor over two layers of ½-inch plywood, over two inches of acoustical mat. Where the firing range overlies rooms or

exterior spaces where the public will be allowed and at detainee processing areas, there will be a resiliently suspended ceiling hanging on spring isolation hangers. Below the resiliently suspended acoustic ceiling will be the finish ceiling. For interior walls, there will be two-inch ballistic tile over steel plate over steel studs, and the metal furring will be isolated from the concrete or masonry interior/exterior structural walls. These design features for ceilings, walls and floors will assist in reducing noise in all frequency bands to the minimum practical level.

The air conditioning equipment located on the roof will be enclosed in a structure and will have vibration springs and reducers.

A standby emergency generator will be located on the ground level. It has been designed to be partially "underground" on the *mauka* (uphill) side, (which faces the closest neighbors), and has a solid concrete wall on both the mauka side and the side directly facing the building. The design should direct most frequencies of sound mainly upwards, but lower frequencies will be audible in adjacent areas. Considering the very limited emergency instances when this generator will be in operation, there will be no substantial noise impact.

Although some noise associated with vehicles exiting and entering the facility will occur, just as it does currently, the parking area located at the back of the property, nearer to homes, will not be at the main entrance and is expected to be relatively quiet.

The No Action Alternative might present no potential noise impacts to nearby sensitive receptors, but it should be noted that if the County had not purchased the property, a single-family home could have been built, which might also have produced noise impacts.

No important viewplanes or scenic sites, including those recognized in the Hawai‘i County General Plan, would be affected. The project will include landscaping to increase the attractiveness of the facility and provide a visual buffer with neighboring residences (see Figure 4c). The elevation of the first floor will be 1,498 feet above sea level, with the top elevation of the building at 1,538 feet. The closest residential properties located *mauka* (uphill) of the new station appear to have their floor elevation at approximately 1,540 feet. Adding six feet to arrive at the direct line of sight out a window at the first floor of the nearest residences, the line of sight will be approximately eight feet above the tallest point of the new building. Therefore, because of the steep topography of the site, view towards the sea from homes that are *mauka* (uphill) of the property should not be substantially affected, nor will views from any other homes be affected.

3.1.5 Hazardous Substances, Toxic Waste and Hazardous Conditions

Environmental Setting, Impacts and Mitigation Measures

A Phase I Environmental Site Assessment (ESA) was performed for the project site by Enviroquest as part of the purchase of the property. The document is available for inspection upon request from Department of Public Works. A Phase I ESA aims to identify *recognized environmental conditions* that exist on the project site and existing *recognized environmental conditions* in the project area that

have the potential to impact the subject property. The term *recognized environmental conditions* means the presence or likely presence of any hazardous substances or petroleum products on the property that indicates an existing release, a past release, or a material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property.

Because there is no evidence that the subject property has been previously used or developed other than for a home and coffee farm, the potential for use or storage of regulated or hazardous chemicals onsite is low. The Enviroquest Phase I ESA determined that there do not appear to be any *recognized environmental conditions* in connection with the property and no source of concern to the public regarding such conditions should the property be developed. Construction of a new police station and expansion of parking areas do not pose any unreasonable risk in terms of worker or public exposure to such materials.

3.2 Socioeconomic and Cultural

3.2.1 Socioeconomic Characteristics

By improving government services of the Police Department, the proposed project would benefit public welfare in South Kona as well as the entire County of Hawai‘i. Table 2 provides information on the socioeconomic characteristics of South Kona along with those of Hawai‘i County as a whole for comparison, from the 2000 U.S. Census of Population.

The existing police and fire station area is adjacent to the vacant lot that was purchased to provide land for the expansion (see Figures 2-3). To the *mauka* (uphill) side of the existing police and fire stations and to the south of the vacant lot are five 1.75-acre or smaller properties that are zoned for agriculture and developed as coffee farms with residences. Seven homes are located in the immediate vicinity of the current South Kona Civic Center and police and fire station buildings, at distances ranging from 50 to about 600 feet.

Impacts

The proposed project action would enhance of County public safety services. No relocation of businesses or homes, disruption of local traffic patterns, substantial effects to neighborhood character or integrity, or any other social impacts are involved in the proposed action, which is proposed for an area in which those services are already being provided.

The proposed design would place buildings as close as 150 feet from existing homes, with parking as close as 100 feet (see Figure 4a). Although some existing homes are already closer than this to buildings and parking lots at the facility, the proposed action would result in five homes being as near as 250 feet from at least one building in the complex, whereas only three are currently this close. Several property owners and residents, while acknowledging that they already live close to the police and fire stations, have expressed concern about that the greater proximity, expanded uses (e.g., the indoor pistol firing range), and loss of dense vegetation that provides a buffer, would adversely change their neighborhood character.

Table 2. Selected Socioeconomic Characteristics

Characteristic	Hawai'i County	South Kona	Characteristic	Hawai'i County	South Kona
Total Population	148,677	8,589	21 to 65 Years, Disabled (%)	19.2	16.3
Median Age	38.6		Disabled but Employed, 21 to 65 Years, (%)	51.8	58.4
Older Than 65 Years (%)	13.5	13.2	65 Years of Older, Disabled (%)	40.3	39.7
Race (%)			Employment in:		
White	31.5	34.1	Management	30.2	33.3
Asian	26.7	24.1	Service	22.2	18.5
Hawaiian	9.7	11.1	Sales and Office	25.1	24.3
Other Pacific Islander	1.5	1.0	Farming, Fishing and Forestry	9.9	4.5
Two or More Races	28.4	27.4	Production, Transportation	8.9	7.3
Hispanic (Any Race)	9.5	7.1			
Family Households (%)	69.6	69.5	Families Below Poverty Line (%)	11.0	8.3
Households with Female Householder, no Husband, With Children (%)	7.7	5.8	Households with Female Householder, no Husband, With Children, Below Poverty Line (%)	28.1	25.8
Householder Lives Alone (%)	23.1	22.2	Individuals Below Poverty Line (%)	15.7	12.7
Average Household Size	2.75	2.76	Over 65 Below Poverty Line	7.2	5.5
Average Family Size	3.24	3.25	Median Household Income ($)	39,805	42,058
Over 25 Years Old With High School Diploma (%)	84.6	84.1	Housing Owner-Occupied (%)	64.5	62.2
Married Now (%)	52.0	51.1	Housing Rented (%)	34.5	37.8
Widowed (%)	6.3	6.1	Housing Vacant (%)	15.5	11.4
Divorced Now (%)	10.7	11.3	Median Home Value, 1999 ($)	153,700	213,000
Veterans (% of adults)	14.5	14.8	Median Rent, 1999 ($)	645	572
Over 16 in Labor Market (%)	61.7	67.2	Rent is Greater Than 25% of Income (%)	46.0	53.9
Residence in 1995 (%)					
Same Home	57.7	64.6			
Different Home, Same County	26.5	21.9			
Different County in Hawai`i	4.8	12.1			
Different State/Country	11.0	10.0			

Source: U.S. Bureau of the Census, May 2001. *Profiles of General Demographic Characteristics, 2000 Census of Population and Housing, Hawai'i.* (U.S. Census Bureau Web Page).

As discussed in Section 3.1.4, above, the facility has been designed so that pistol noise from the indoor firing range will probably not be distinctly audible outside the station building. The parking area located nearest to adjacent homes will not be at the main entrance and is expected to be relatively quiet. Landscaping at the edges of the property will increase the attractiveness of the facility and provide a visual buffer with neighboring residences.

While the No Action Alternative would not require the expenditure of public funds and would not produce any neighborhood impacts, it would obviate public benefit from the project.

3.2.2 Cultural and Historic Resources

Background

The project site is within the *ahupuaʻa* of Kealakekua in the South Kona District on the west side of the Island and County of Hawaiʻi. The first colonization of Hawaiʻi Island is believed to have occurred on the eastern or windward side by 300 A.D. According to *Gardens of Lono, Archaeological Investigations at the Amy B.H. Greenwell Ethnobotanical Garden*, a compilation of archaeological work in the area and other works, early settlers first came to the Kona coast on the western or leeward side of the island for the procurement of resources during the Early Expansion period from 600-1100 A.D. (Cordy 1995). Permanent habitation of Kona began toward the end of that period (Cordy 1981, 1995; Schilt 1984).

The project site is within the boundaries of the Kona Field System, a dryland agricultural complex that extends from the coast to the forested slopes of Kona (Cordy 1995). The system was a nearly continuous series of fields stretching from the Kau Ahupuaʻa in North Kona to Hoʻokena, south of the project area.

The project area falls with the *ʻapaʻa* human environmental zone, which typically has rock mounds and terraces along with *kuaiwi*, the distinctive rock walls prominent in the Kona Field System (Cordy 1995, Newman 1970). Believed to be constructed of rocks cleared from planting areas, *kuaiwi*, along which sugar cane was sometimes planted, run perpendicular to the coastline and are intersected by shorter cross-walls, lending a rectangular pattern to the fields.

The *ahupuaʻa* of Kealakekua figures prominently in the history of Hawaiʻi and particularly Kona, as it was not only a center of settlement and royalty but also the focal point of western contact. After he united Hawaiʻi Island, ʻUmi a Liloa moved the royal court from Waipiʻo to Kona, which remained central to struggles for political dominance over the island. The battle at Mokuʻohai, which is located between Kealakekua and Honaunau to the south, is recognized as a key point in the rise of Kamehameha I to power.

Kealakekua Bay, which is about a mile *makai* (downhill) of the project site, is widely recognized as the place where Captain James Cook first initiated western contact with Hawaiʻi, with his visit and subsequent death taking place at Kaʻawaloa, at the north end of the bay. Accounts of that and later visits by explorers, whalers, and missionaries describe thriving communities with a highly developed system of agriculture. Indeed, a member of Cook's crew estimated the population around Kealakekua Bay to be 15,000 (Ledyard 1963). According to Cook's midshipman Gilbert, "the country here is one entire plantation; as far as we could see from the ship which is divided into squares by stones thrown together or hedges of sugar cane" (Holmes 1982).

Archaeological Resources

The history of the vacant 1.3-acre parcel (as well as that of the entire project site) generally reflects the upland regions of Kealakekua, including presumed presence of the Kona Field System. The property was previously owned by Kealakekua Ranch, Ltd. It was leased out through the years to various tenants for residential and some agricultural usage, as the coffee and other fruit trees on the property suggest. The subject property was transferred on February 26, 2008 to the County of Hawai‘i. The property had a single-story, 998 square-foot wooden home built in 1939 as well as a small lean-to structure and a small wooden shed. The buildings were demolished in February 2008. The property also had a cesspool to service the house. It was filled and closed according to regulations in February 2008, prior to closing the transfer of the property to the County of Hawai‘i.

An archaeological inventory survey (AIS) of the vacant 1.3-acre property was conducted by SCS, Inc. The report is briefly summarized below and attached in full as Appendix 2. Fieldwork recorded one historic agricultural site, State Site Number 50-10-47-27619. The site comprises four features: one wall, one terrace, and two mounds – all built of stacked or piled rock. Excavation took the form of 43 shovel probes (spanning the project area) and one stratigraphic trench (within the terrace). Soil stratigraphy was very uniform throughout, and cultural material was limited to modern debris, aside from a midden deposit within ST-1 that offers evidence of Historic-period construction. It is likely that all features within the project were constructed between 1800 and 1950.

Archaeological Impacts and Mitigation Measures

All four of these historic features, as well as 50-10-47-27619 as a whole, have been assessed as significant under Criterion D of the Hawai‘i State Register of Historic Places. The information contained within this site that is considered valuable to the historic record has been documented. Based upon the results of the inventory survey, further archaeological work would not contribute a significant volume of additional data to the interpretation of the history of the project area or region. The SHPD has approved the AIS (see Appendix 1a for letters of approval), including the recommendation of no further archaeological work.

However, as a further precaution, in the unlikely event that human skeletal remains, undocumented archaeological resources, or cultural or traditional remains are encountered during future development activities within the project site, work in the immediate area of the discovery shall be halted and the State Historic Preservation Division contacted as outlined in Hawai‘i Administrative Rules 13§13-275-12.

Cultural Resources and Traditional and Customary Practices

As part of the current study an effort was made to obtain information about any potential traditional cultural properties and associated practices that might be present, or have taken place in this area of South Kona. The context of the project site is a residential-agricultural lot that until 2008 had a single-family home and a coffee farm. The vegetation is a combination of old coffee trees and various trees that were planted for shade, food or ornamental purposes by the former resident. The property

was surveyed for botanical resources, as discussed in Section 3.1.3. The Office of Hawaiian Affairs was contacted by letter. Five adjacent property owners were contacted to determine if they had any knowledge of natural or cultural resources or issues. As part of due diligence for purchasing the property, a Phase I ESA was conducted that researched property use over the last decades. As discussed in the previous section, no significant archaeological remains reflecting cultural history or supporting cultural values are present. To date, no information has been received that would indicate any cultural resources or practices taking place on the property.

The project site does not appear to contain the quality and quantity or resources that would be important for native gathering. Furthermore, no caves, springs, *pu‘u*, native forest groves, gathering resources or other natural features are present on or near the project site. The project site does not support any known traditional resource uses, nor are there any Hawaiian customary and traditional rights or practices known to be associated with the property. In summary, it would appear that no valuable natural, cultural or historical resources are present.

Cultural Impacts and Mitigation Measures

Although there are no indications so far from literature review or consultation with the State Historic Preservation Division, the Office of Hawaiian Affairs, or local residents knowledgeable about Hawaiian cultural practices that there are any traditional cultural properties or practices on or near the small residential lot that is the only undeveloped part of the project site, various parties including the Office of Hawaiian Affairs and State Historic Preservation Division are being supplied a copy of the EA in order to help finalize this finding.

3.3 Infrastructure

3.3.1 Utilities

Existing Facilities and Services, Impacts and Mitigation Measures

Electrical power to the site is supplied by Hawai‘i Electric Light Company (HELCO), a privately owned utility company regulated by the State Public Utilities Commission, via its island-wide distribution network. Exterior lighting will consist of low-pressure sodium floodlights with horizontal shielding to adhere to Hawai‘i County’s lighting ordinance (Hawai‘i County Code, Article 9). Depending on budget, the project may include photovoltaic panels on the roof, screened by the roof parapet. Water is provided by the Hawai‘i County Department of Water Supply. Telephone service is available from Hawaiian Telcom for the project. A wastewater system consisting of septic tanks with absorption beds in conformance with Department of Health requirements will be built in the front parking lot (see Figure 4b for location). The project includes dual-flush toilets and low-flow aerated faucets that will provide a 30 percent reduction in wastewater and assist in water conservation.

3.3.2 Roadways and Traffic

In order to quantify and describe the traffic-related characteristics and determine if traffic operations in the vicinity would be impacted, Phillip Rowell Associates prepared a Traffic Impact Assessment (TIAR) for the project. The full report is contained in Appendix 3 and summarized below.

Existing Facilities and Impacts

As shown in Figure 4, the existing parking lot for the civic center will be expanded and a new parking lot constructed behind this parking lot and adjacent to the new building (this lot will be used for police parking only). Access would be via the two existing access ways and a new project driveway, along the east side to Mamalahoa Highway, approximately 250 south of the existing driveway to the civic center, across from Kamakani Street. Accordingly, the following intersections were analyzed in the TIAR:

- Mamalahoa Highway at Kinue Road
- Mamalahoa Highway at Kamakani Street
- Mamalahoa Highway at New Project Driveway

The existing lane configuration and right-of-way controls are shown in diagrams in Appendix 3. Mamalahoa Highway is the only major north-south highway in the vicinity of the project, conducting traffic between North Kona and South Kona and beyond to Ka‘u. The roadway has one lane in each direction and a median left turn lane along the entire section adjacent to the existing civic center and proposed project. The posted speed limit is 30 miles per hour. In the vicinity of the proposed project, Mamalahoa Highway is under the jurisdiction of the County of Hawai‘i. All the study intersections are unsignalized and have separate left turn storage lanes. Between the intersections, the median is a two-way-left-turn lane.

Impacts and Mitigation Measures

The TIAR undertook a number of procedural steps. First, current traffic volumes at the subject intersections were estimated from manual traffic counts performed in October 2009. The intersection configuration and right-of-way controls were verified during a field reconnaissance of the project site during October 2009. Existing traffic operating conditions of the study intersections were determined using the methodology described in the *2000 Highway Capacity Manual* (Institute of Transportation Engineers 2000). This included analysis of level-of-service (LOS). There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in Table 1 of Appendix 3. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. LOS D is typically considered acceptable for peak hour conditions in urban areas. Appendix 3 contains tables and maps that display these volumes and levels for each intersection.

The next step was to estimate the background traffic (future traffic conditions without the proposed project) at the year 2015, by which time the new station is expected to be built and in operation. This was done by applying a background traffic growth factor to existing traffic levels. The results are shown in Appendix 3.

Next, the number of peak-hour trips that the proposed project would generate was estimated using standard trip generation procedures (Institute of Transportation Engineers 1998, 2003). The project is estimated to generate 42 inbound and 6 outbound trips during the morning peak hour. During the afternoon peak hour, the project would generate 19 inbound and 43 outbound trips. The traffic engineer distributed and assigned these trips to the different intersection approaches based on the available approach and departure routes, as shown in diagrams in Appendix 3.

The project-related traffic was then superimposed on background traffic volumes. The traffic impacts of the project were assessed by analyzing the future levels-of-service with and without project-generated traffic. The purpose of this analysis was to identify potential operational deficiencies in the project area and to quantify changes in the intersection levels-of-service as a result of project generated traffic.

The principal conclusions of the traffic impact assessment were that the eastbound approach of Kamakani Street to Mamalahoa Highway would operate at LOS E during the morning peak hour, which is the same as existing, and LOS D during the afternoon peak hour. All the remaining controlled lane groups will operate at LOS C, or better. Also, there are no changes in the level-of-service of any lane group as a result of project-generated traffic except the westbound approach of Kinue Road at Mamalahoa, where the level-of-service changes from LOS B to LOS C. As all controlled traffic movements except the eastbound approach of Kamakani Street, which is considered a minor or side street approach, will operate at LOS C or better, impacts are considered very minor, and no mitigation is recommended.

3.4 Secondary and Cumulative Impacts

Because it involves a replacement for a pre-existing police station, the proposed project would not involve major secondary impacts, such as population changes or effects on public facilities. Although the project would provide short-term construction jobs, these would largely be filled by local residents and would not induce in-migration.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures.

While development of residential projects of relatively small scale takes place periodically in South Kona, and the project area is expected to benefit from the anticipated opening of the Mamalahoa Bypass project connecting Keauhou to Captain Cook, these actions would not appear to have impacts that would potentially combine with those of the proposed project in such a way as to produce adverse cumulative effects or involve a commitment for larger actions.

The adverse effects of the project – minor and temporary disturbance to air quality, noise or visual quality during construction – are very limited in severity, nature and geographic scale.

3.5 Required Permits and Approvals

The following permits and approvals would be required:

- County of Hawai‘i, Department of Public Works: Grubbing and Grading Permits, Building Division Approval and Building Permit, Permit for Work in County ROW
- County of Hawai‘i, Planning Department Plan Approval
- State of Hawai‘i, Department of Health, Underground Injection Control Permit.

3.6 Consistency With Government Plans and Policies

3.6.1 Hawai‘i State Plan

Adopted in 1978 and last revised in 1991 (Hawai‘i Revised Statutes, Chapter 226, as amended), the Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State's long-run growth and development activities. The three themes that express the basic purpose of the *Hawai‘i State Plan* are individual and family self-sufficiency, social and economic mobility and community or social well-being. The proposed project would promote these goals by enhancing public safety services on the Island of Hawai‘i, thereby enhancing quality-of-life and community and social well-being.

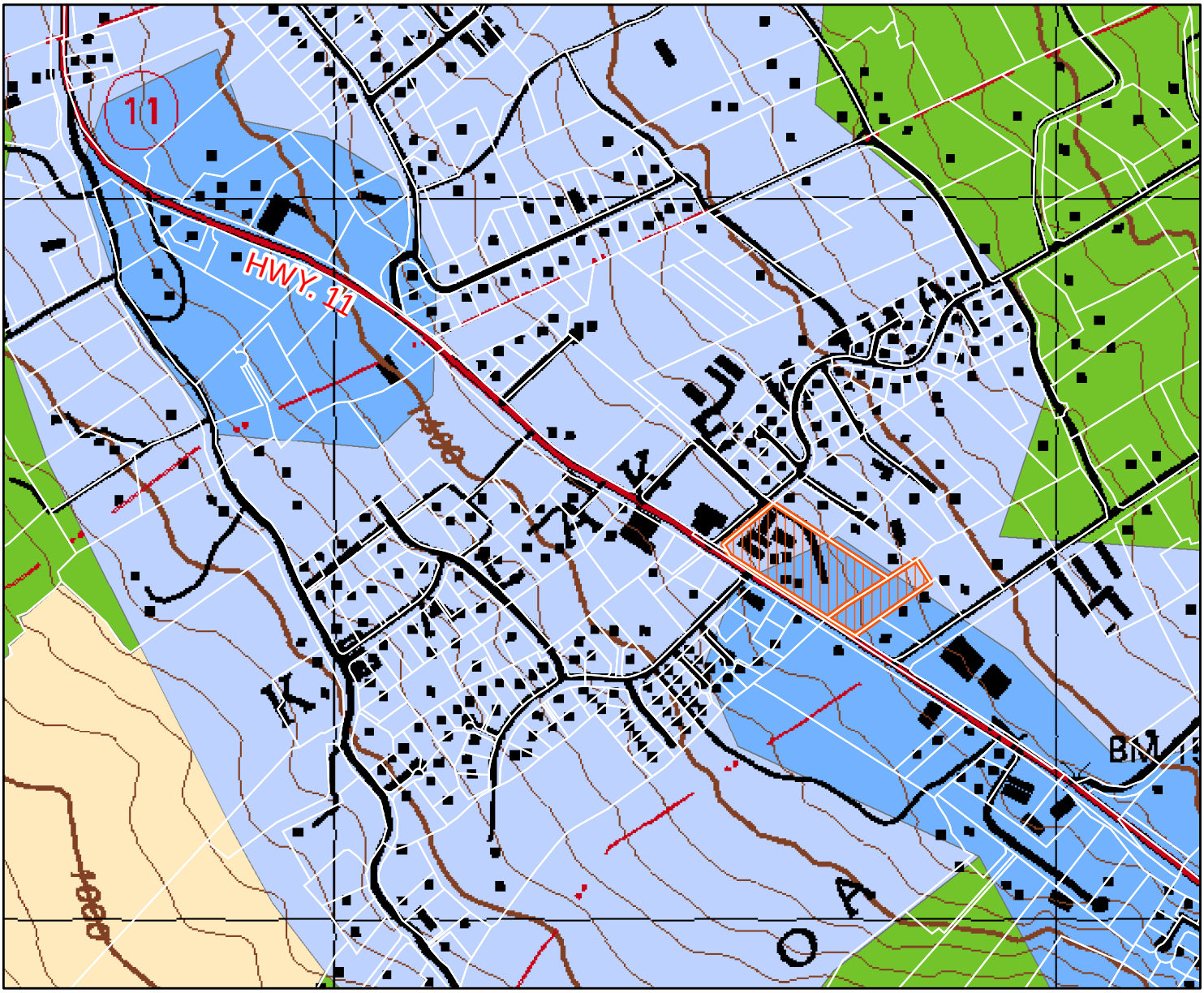
3.6.2 Hawai‘i State Land Use Law

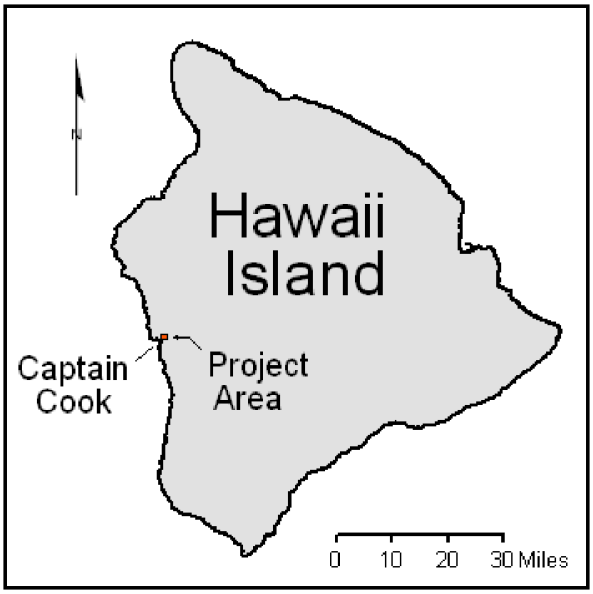
All land in the State of Hawai‘i is classified into one of four land use categories – Urban, Rural, Agricultural, or Conservation – by the State Land Use Commission, pursuant to Chapter 205, HRS. The property is in the State Land Use Urban District. The proposed use is consistent with intended uses for this Land Use District.

3.6.3 Hawai‘i County Zoning and General Plan

Hawai‘i County General Plan Land Use Pattern Allocation Guide (LUPAG). The LUPAG map component of the *General Plan* is a graphic representation of the Plan's goals, policies, and standards as well as of the physical relationship between land uses. It also establishes the basic urban and non-urban form for areas within the planned public and cultural facilities, public utilities and safety features, and transportation corridors. According to an August 31, 2009 letter from the Hawai‘i County Planning Department (see Appendix 1a), the General Plan LUPAG designations are Low-Density Urban and Medium-Density Urban (Figure 6). Medium-Density Urban is described as "village and neighborhood commercial and single family and multiple family residential and related functions (multiple family residential – up to 35 units per acre)." The remainder of the properties is classified as Low-Density Urban where uses are described as "residential, with ancillary community

Figure 6. LUPAG Map





Base Map: U.S.G.S. Quadrangle Maps, 1977
LUPAG Data: Hawaii County Planning Dept., 2007
Parcels Data: Hawaii County Planning Dept., 2009

Captain Cook, Hawaii

LUPAG

Subject Parcels
8-2-001:072
8-2-001:084

Feet
0 1,000

Miles
0 0.1 0.2

Legend

Area Parcels

Subject Parcels

LUPAG

Land Use Pattern Allocation Guide

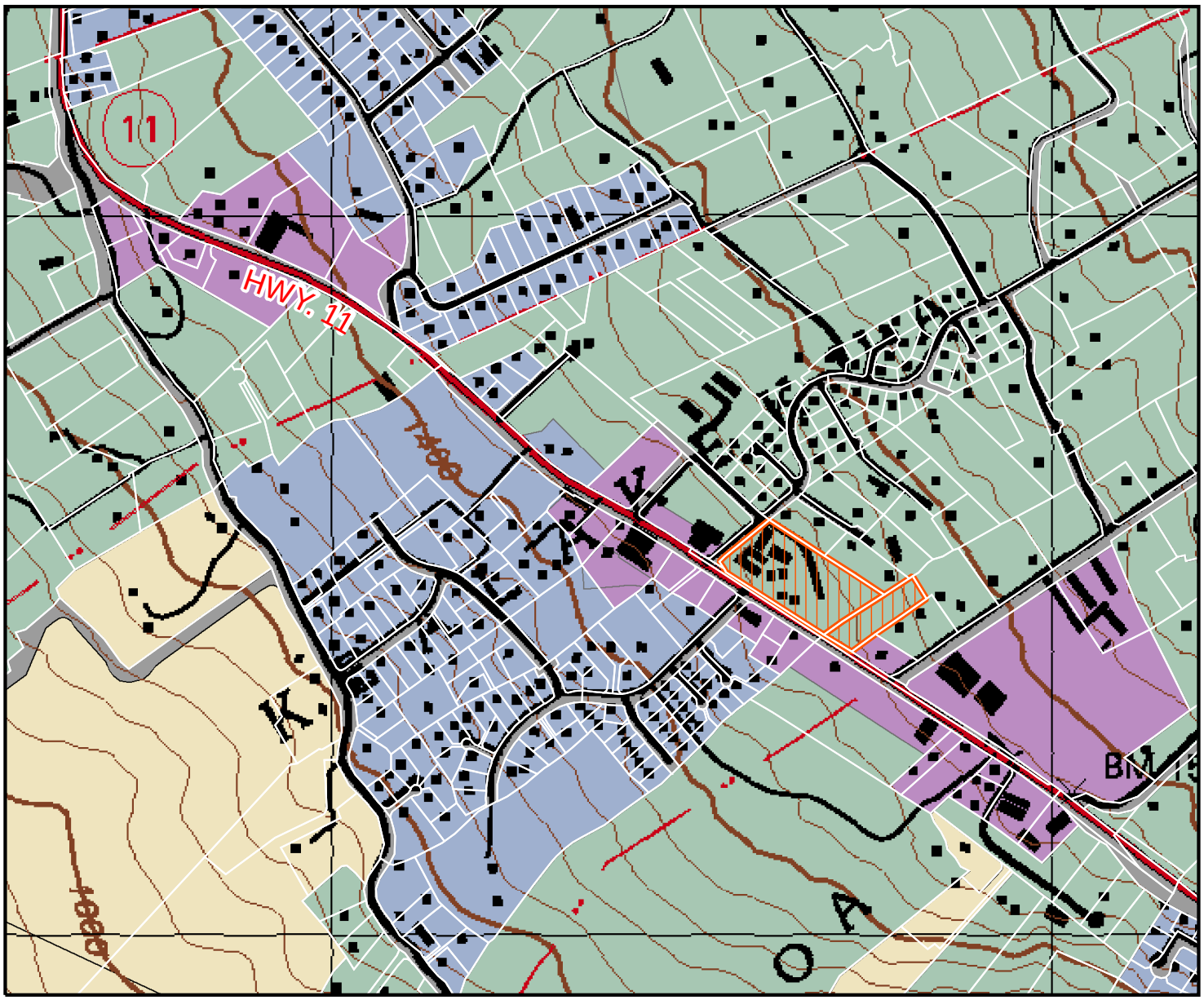
Low Density Urban

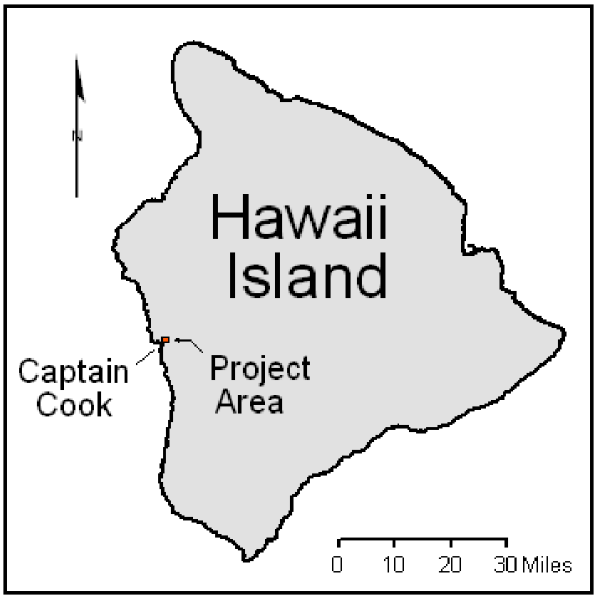
Med. Density Urban

Rural

Important Ag. Land

Figure 7. County Zoning Map





Base Map: U.S.G.S. Quadrangle Maps, 1977
Zoning Data: Hawaii County Planning Dept., 2007
Parcels Data: Hawaii County Planning Dept., 2009

Captain Cook, Hawaii

Subject Parcels
8-2-001:072
8-2-001:084

Feet
0 1,000
Miles
0 0.1 0.2

Legend

Area Parcels

Subject Parcels

County Zoning

Agricultural

Commercial

Residential / Ag.

Residential

Note: Hawaii County Zoning data generalized (e.g. A-1a, A-3a A-5a etc. lumped as "Agricultural")

and public uses, and neighborhood and convenience-type commercial uses; overall residential density may be up to six units per acre." The project is consistent with these designations.

Hawai'i County Zoning and SMA. County zoning is Agricultural (A-1a) (Figure 7). The Hawai'i County Code, Chapter 25, Section 25-4-11(c) states: that "Public uses, structures and buildings and community buildings are permitted uses in any district, provided that the director has issued plan approval for such use." Therefore, the proposed facility would be allowed. The project site is not situated within the County's Special Management Area (SMA). It should again be noted that as the building must cross property lines to fit on the site, the Police Department plans to apply for a variance from setback requirements prior to Plan Approval.

The *General Plan* for the County of Hawai'i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai'i. The plan was adopted by ordinance in 1989 and revised in 2005 (Hawai'i County Department of Planning). The *General Plan* itself is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai'i. Most relevant to the proposed project are the following Policies, Standards, Goals, and Courses of Action:

PROTECTIVE SERVICES – POLICIES

- Development of police and fire facilities should entail joint use structures whenever feasible.
- The establishment of a fire/police facility should consider the site size and locations that permit quick and efficient vehicular access.
- Stations in outlying districts shall be based on the population to be served and response time rather than on geographic district.
- Encourage the further development and expansion of community policing programs and neighborhood and farm watch programs in urban, rural and agricultural communities.

PROTECTIVE SERVICES – DISTRICT OF SOUTH KONA

- Service facilities shall be improved to meet needs.

GOVERNMENT OPERATIONS – STANDARDS

- Public office center sites shall satisfy modern and reasonable requirements of accessibility and compatibility with the surrounding neighborhood.
- The multipurpose concept of flexibility to satisfy changing requirements should be part of the design for public buildings.

GOVERNMENT OPERATIONS – SOUTH KONA COURSE OF ACTION

- Consolidate government offices in a public office center.
- Provide services in West Hawai'i as is feasible.

PUBLIC LANDS – GOALS

- Utilize publicly owned lands in the best public interest and to the maximum benefit.

Discussion: The proposed project satisfies relevant goals, policies, and courses of action related to protective service facilities in Hawai‘i County, including those dealing with government operations. The proposed new South Kona Police Station will improve response times for South Kona and therefore further expansion of neighborhood and farm watch programs.

3.6.3 Kona Community Development Plan

The Kona Community Development Plan (CDP) encompasses the judicial district of North and South Kona, and was developed under the framework of the February 2005 County of Hawai‘i General Plan. Community Development Plans are intended to translate broad General Plan Goals, Policies, and Standards into implementation actions as they apply to specific geographical regions around the County. CDPs are also intended to serve as a forum for community input into land-use, delivery of government services and any other matters relating to the planning area.

The General Plan now requires that a Community Development Plan shall be adopted by the County Council as an “ordinance,” giving the CDP the force of law. This is in contrast to plans created over past years, adopted by “resolution” that served only as guidelines or reference documents to decision-makers. The Kona CDP was adopted in September 2008 by the County Council. The version referenced in this Environmental Assessment is at: http://www.hcrc.info/community-planning/community-development-plans/kona/cdp-final-drafts/Final%20KCDP_Sept%202008_text.pdf.

The Plan has many elements and wide-ranging implications, but there are several major strategies that embody the guiding principles related to the economy, energy, environmental quality, flooding and other natural hazards, historic sites, natural beauty, natural resources and shoreline, housing, public facilities, public utilities, recreation, transportation and land use.

The South Kona Police Station is generally consistent with all aspects of the Kona CDP. It is in keeping with the plan’s guiding principles in Chapter 3, including item No. 6:

> **Provide infrastructure and essential facilities concurrent with growth.** Future growth shall occur where infrastructure (roads and utilities) and essential facilities (i.e. police, fire and schools) are already in place. *These facilities should be maintained at a level that will enhance the quality of life for Kona residents.* (emphasis added)

It also conforms with item No. 8:

> **Promote effective governance:** An effective and accountable regional government structure that improves the quality of life for Kona residents should manage the impacts of growth and meet the needs of the Kona community by encouraging cooperation among public, private, and civic partners, ensuring equitable distribution of resources, and instituting policies and regulations in a predictable and consistent manner.

The project is also consistent with Section 4.2.2, Overall Strategy for Land Use, which states that "future growth should be directed to the existing rural towns and villages in a way that revitalizes and enhances the existing rural lifestyle and culture of those communities."

The project is proposed for the developed core of the town of Captain Cook, and the resulting public safety service will enhance the rural lifestyle of the South Kona area. As Captain Cook is designated by the plan as a Rural Town Transit Oriented Development (TOD), the project is consistent with that portion of the plan which guides growth in such areas.

The project, which is proposed for land designated by the General Plan's LUPAG maps as combination of Low and Medium Density Urban, is in keeping with other parts of that section regarding rural areas, including:

> **Policy LU-1.3: Rural Area.** The rural area consists of the lands outside of the Kona Urban Area. Future growth in this area shall be concentrated within and around the existing LUPAG medium and low density areas, which correspond to the existing rural towns.

and:

> **Policy LU-1.4: Consistency with Land Use Pattern Allocation Guide (LUPAG).** The current LUPAG accommodates the vision and needs for the Kona CDP area planning horizon and should be amended only for compelling reasons. Any rezoning application should be consistent with the LUPAG.

The project is also consistent with Section 4.6, Public Facilities, Infrastructure, and Services, which notes that a new police station is proposed for the Captain Cook site, as shown in the Kona CDP's Figure 4-10a, Official Public Facilities and Services Map – Public Safety. Page 4-101.

> **Policy PUB.2.1: Law Enforcement Level of Service.** To enable timely response over a geographic area spanning approximately 60 miles long, there should be, at a minimum, a police station for North Kona and another police station for South Kona. ...

Action statement PUB-2.1c specifically states: "Design and construct the relocated South Kona police station. The County is in the process of acquiring a site (TMK 8-2-001:072 and 084) (Police, 2-3)." Also, there are several other action statements in the plan in support of the project including PUB-2.1d, which calls for supporting the addition of manpower for policing efforts.

PART 4: DETERMINATION

The Hawai‘i County Department of Public Works has determined that the proposed project is not likely to significantly alter the environment, as impacts will be minimal, and intends to issue a Finding of No Significant Impact (FONSI). This determination will be reviewed based on comments to the Draft EA, and the Final EA will present the final determination.

PART 5: FINDINGS AND REASONS

Chapter 11-200-12, Hawai‘i Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

1. *The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No valuable natural or cultural resources would be committed or lost.
2. *The proposed project will not curtail the range of beneficial uses of the environment.* The proposed project expands and in no way curtails beneficial uses of the environment.
3. *The proposed project will not conflict with the State's long-term environmental policies*. The State’s long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The project is not major and fulfills aspects of these policies calling for an improved social and economic environment. It is thus consistent with all elements of the State’s long-term environmental policies.
4. *The proposed project will not substantially affect the economic or social welfare of the community or State.* The project will benefit the economic and social welfare of the community by enhancing the County’s public safety services. The project site is a part of an area already dedicated to public safety services. The surrounding area supports residential, recreational and commercial uses, and the project has been designed to avoid or mitigate substantial effects on these uses.
5. *The proposed project does not substantially affect public health in any detrimental way*. The proposed project will benefit public health by improving public safety.
6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities*. No adverse secondary effects are expected to result from the proposed action. The project will not enable development, but will instead help assure improved public safety.
7. *The proposed project will not involve a substantial degradation of environmental quality*. The implementation of best management practices for construction will ensure that the project will not degrade the environment in any substantial way.
8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* No endangered species of flora or fauna are present on the project site or would be affected in any way by the project.

9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* The project is not related to additional activities in the region in such a way as to produce adverse cumulative effects or involve a commitment for larger actions.
10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No adverse effects on these resources would occur. Mitigation of construction-phase impacts will preserve water quality. Ambient noise impacts due to construction will be temporary and restricted to reasonable daytime hours. Design features help mitigate permanent noise impacts, which will not be substantial, and views from adjacent homes should not be substantially affected.
11. *The project does not affect nor would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area.* Although the project is located in an area with volcanic and seismic risk, the entire Island of Hawai‘i shares this risk, and the project is not imprudent to construct, and employs design and construction standards appropriate to the seismic zone.
12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No scenic vistas and viewplanes identified in the Hawai‘i County General Plan will be adversely affected by the project. The buildings will match surrounding buildings of similar height. The project includes buffer areas to neighboring residences to help reduce visual impact.
13. *The project will not require substantial energy consumption*. The project involves only minor energy use and no adverse effects are expected. The building will be designed for equivalency compliance with LEED Silver Rating for energy performance.

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ENVIRONMENTAL ASSESSMENT

South Kona Police Station

TMK: (3rd) 8-2-001:072 and 084
South Kona District, Hawai‘i Island, State of Hawai‘i

APPENDIX 1a
Comments in Response to Early Consultation

William P. Kenoi
Mayor

BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

County of Hawaii

PLANNING DEPARTMENT
Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720
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August 31, 2009

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo HI 96721

Dear Mr. Terry:

SUBJECT: Environmental Assessment Consultation
Applicant: Hawai'i County Department of Public Works
Project: New South Kona Police Station
Tax Map Key: 8-2-1:72 and 84, South Kona, Hawai'i

This is in response to your request for comments on the above-referenced project.

According to your submittal, the Department of Public Works will be constructing a new Police Station adjacent to the existing Police and Fire Stations in Captain Cook.

We note the following for each parcel:

1. It is designated Low Density Urban and Medium Density Urban by the General Plan's Land Use Pattern Allocation Guide (LUPAG) Map.

2. The Kona Community Development Plan was adopted by the County of Hawai'i as Ordinance No. 08-131, effective September 25, 2008. A discussion of the proposed project as it relates to this plan should be included in the Environmental Assessment.

3. The State Land Use designation is Urban.

4. County of Hawai'i zoning is Agricultural (A-1a).

5. The Hawai'i County Zoning Code, Section 25-4-11(c) states *that "Public uses, structures and buildings and community buildings are permitted uses in any district, provided that the director has issued plan approval for such use".*

6. The project area consists of separate parcels. Therefore, unless the parcels are consolidated, all improvements must comply with the minimum setback requirements for each parcel.

7. It is not located within the County's Special Management Area.

Please provide us with a copy of the Environmental Assessment for our review and file.

If you have questions, please contact Esther Imamura of this office at 961-8139.

Sincerely,

BJ LEITHEAD TODD
Planning Director

ETI:cs
P:\Public\Wpwin60\ETI\Eadraftpre-Consul\Terry Kona Police Station 8-2-1-72 -84.Rtf

xc: Planning Department – Kona

William P. Kenoi
Mayor

Lono A. Tyson
Director

Ivan M. Torigoe
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
25 Aupuni Street • Hilo, Hawai'i 96720
(808) 961-8083 · Fax (808) 961-8086
http://co.hawaii.hi.us/directory/dir_envmng.htm

August 24, 2009

GEOMETRICIAN ASSOCIATES, LLC
P. O. Box 396
Hilo, HI 96721

Attention: Mr. Ron Terry

RE: Early Consultation for EA for New Hawai'i County Police Station
South Kona District
TMK: 8-2-001:072 and 084

Dear Mr. Terry,

We offer the following comments on the subject project.

Solid Waste Division
The project will require submittal of a solid waste management plan during the permitting process through Planning. A copy of the Solid Waste Management Plan Guidelines is on our website. In addition, the Mayor has issued a Memorandum promoting County Recycling programs for county facilities and county employees. Implementing the recycling program as part of the normal operations once the facility is constructed should be addressed as it has social, cultural and community impacts, and economic impacts.

Thank you for allowing us to review and comment on this project.

With Regards and Aloha,

Lono A. Tyson
DIRECTOR

cc: Director, OEQC
SWD

12034R

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
HWY-PS
2.3132

August 31, 2009

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

Subject: Early Consultation, Environmental Assessment
New County of Hawaii South Kona Police Station
Hawaii, South Kona, Captain Cook, TMK: (3) 8-2-001:072, 084

Thank you for requesting our early input.

The proposed police station will access roads under the jurisdiction of the County of Hawaii. It is not expected to impact our State highway facilities.

Very truly yours,

KEN K. TATSUGUCHI
Engineering Program Manager
Highways Division
Planning Branch

Regarding your request for comments on the proposed new Hawaii County Police Station at Captain Cook, we offer a few thoughts on matters that we believe
may negatively affect us as neighboring property owner.

1. The indoor pistol firing range must go elsewhere, unless it can be made completely soundproof.

2. Should the site be altered by grading creating a bank at or close to the boundary line, the cut must be adequately protected from landslides and erosion.
   Fencing for safety and security should be included.

3. I f the land is to be left unchanged, a fence should be put in place along the boundary line to provide reasonable
   security to at least discourage unwanted trespassing from public into private areas.

These are comments we offer at the present time for consideration. We would appreciate getting up-dated information of interest
and concern to us when available

Yes, please send us a copy of the EA/notification of the EA availability when completed.
Mahalo.

Sincerely,

John Y.Iwane
John Y. Iwane Trust

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

September 10, 2009

Ron Terry, Principal
Geometrician Associates
PO Box 396
Hilo, Hawaii 96721

LOG NO: 2009.3300
DOC NO: 0909MD07
Archaeology

Dear Mr. Terry:

SUBJECT: Chapter 6E-8 Historic Preservation Review –
Request for Comment on Early Consultation for Environmental Assessment for New Hawaii County Police Station
Kealakekua and Kiloa 1st & 2nd Ahupua'a, South Kona District, Island of Hawai'i
TMK: (3) 8-2-001:072 and 084

Thank you for the opportunity to comment on the aforementioned project, which we received on August 24, 2009. According to our records we reviewed an EA for the Ke Kama Pono Program Facility in 2008 for parcel 84 (*Log No. 2008.1475, Doc No. 0811AL49 and Log No. 2008.2309, Doc No. 0806MD48*). At that time we noted that alterations to the current vacant building on that parcel would require asbestos remediation, but that we understood the building to be less than 50 years old. We have no records specifically incorporating parcel 72; however, it does fall within the area of the agricultural area known as the Kona Field System, deemed eligible for listing on the National Register on December 12, 1973.

If you have questions about this letter please contact Morgan Davis at (808) 933-7650.

Aloha,

Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
and Historic Preservation Manager
State Historic Preservation Division

Cc: SHPD Architecture Branch

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

October 6, 2009

Ron Terry, Principal via email to: rterry@hawaii.rr.com
Geometrician Associates, LLC
PO Box 396
Hilo, Hawaii 96721

LOG NO: 2009.3379
DOC NO: 0910MD03
Archaeology

Dear Mr. Terry:

SUBJECT: Chapter 6E-8 Historic Preservation Review –
Correspondence Regarding an Environmental Assessment for the New Hawaii County Police Station in South Kona
Kealakekua & Kiloa 1st & 2nd Ahupua`a, South Kona District, Island of Hawaii
TMKs: (3) 8-2-001:072 & 084

Thank you for your correspondence regarding this project, which we received on September 14, 2009. You requested our recommendation regarding the need for an assessment on parcels 072 and 084.

You provided us with photographs of parcel 072 which appears to be completely overgrown with vegetation. Because we can not judge whether or not historic properties may be present we request that an archaeological assessment be performed on parcel 072; should historic properties be found then an archaeological inventory survey would be necessary.

Parcel 084 contains the current police station. If this structure is over 50 years old and it is going to be demolished or modified then it may require an architectural assessment. If that is the case then our Architecture Branch should be consulted. If you have questions about this letter please contact Morgan Davis at (808) 933-7650.

Aloha,

Nancy McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
and Historic Preservation Manager
State Historic Preservation Division

Cc: SHPD Architecture Branch, Kapolei

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

October 6, 2009

Ron Terry, Principal via email to: rterry@hawaii.rr.com
Geometrician Associates, LLC
PO Box 396
Hilo, Hawaii 96721

LOG NO: 2009.3379
DOC NO: 0910MD03
Archaeology

Dear Mr. Terry:

SUBJECT: Chapter 6E-8 Historic Preservation Review –
Correspondence Regarding an Environmental Assessment for the New Hawaii County Police Station in South Kona
Kealakekua & Kiloa 1st & 2nd Ahupua`a, South Kona District, Island of Hawaii
TMKs: (3) 8-2-001:072 & 084

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Parcel 084 contains the current police station. If this structure is over 50 years old and it is going to be demolished or modified then it may require an architectural assessment. If that is the case then our Architecture Branch should be consulted. If you have questions about this letter please contact Morgan Davis at (808) 933-7650.

Aloha,

Nancy McMahon, Deputy SHPO/State Archaeologist
and Historic Preservation Manager
State Historic Preservation Division

Cc: SHPD Architecture Branch, Kapolei

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD09/4619

October 8, 2009

Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hi 96721

RE: Early Consultation for Environmental Assessment for the new Hawai'i County police station, TMK: 8-2-001:072 and 084, South Kona, Hawai'i Island.

Aloha e Ron Terry,

The Office of Hawaiian Affairs (OHA) is in receipt of your letter requesting comments on the above-mentioned project. The Hawai'i County Department of Public Works proposes to construct a new South Kona police station adjacent to the existing police and fire stations in Captain Cook. OHA has reviewed the project and offers the following comments.

The Draft Environmental Assessment should include a Cultural Impact Assessment (CIA), in accordance with Chapter 343 of the Hawaii Revised Statues (HRS). The CIA should include information relating to the Native Hawaiian practices and beliefs associated with the general area of the project site, and it is recommended that the community be involved in this assessment. Consideration must also be afforded to any individuals accessing the project area for constitutionally protected traditional and customary purposes, in accordance with the Hawai'i State Constitution, Article XII, Section 7.

OHA requests clarification whether an archaeological inventory survey for the project will be submitted to the State Historic Preservation Division for review and approval. If so, OHA should be allowed the opportunity to comment on the criteria assigned to any cultural or archaeological sites identified within the archaeological inventory survey. In addition, we request the applicant's assurances that should iwi kūpuna or Native Hawaiian cultural or traditional deposits be found during the construction of the project, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

In addition, OHA recommends that the applicant use native vegetation in its landscaping plan for subject parcel. Landscaping with native plants furthers the traditional Hawaiian concept of mālama ʻāina and creates a more Hawaiian sense of place.

Thank you for the opportunity to comment. If you have further questions, please contact Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

ʻO wau iho nō me ka ʻoiaʻiʻo,

Clyde W. Nāmuʻo
Administrator

C: OHA Kona CRC Office

ENVIRONMENTAL ASSESSMENT

South Kona Police Station

TMK: (3rd) 8-2-001:072 and 084
South Kona District, Hawai‘i Island, State of Hawai‘i

APPENDIX 2
Archaeological Report

SCS Project Number 1104-AIS-3

AN ARCHAEOLOGICAL INVENTORY SURVEY FOR THE NEW HAWAII COUNTY POLICE STATION IN CAPTAIN COOK KEALAKEKUA AND KILOA 1ST AND 2ND AHUPUA`A SOUTH KONA DISTRICT, HAWAI`I ISLAND, HAWAI`I [TMK (3) 8-2-001:072]

Prepared by:
Jon Wilson, B.A.
and
Robert L. Spear, Ph.D.

Revised: April 2010

Prepared for:
Fleming & Associates, LLC
557 Manono Street
Hilo, Hawaii 96720

ABSTRACT

Scientific Consultant Services, Inc. conducted an Archaeological Inventory Survey at the request of Fleming & Associates, LLC (architects) on a 1.2587-acre vacant parcel. Proposed plans for the site involve developing a portion of this project area for the construction of a new, larger Hawaii County Police Station site in Captain Cook, Kealakekua and Kiloa 1st and 2nd Ahupua`a, South Kona District, Hawai`i Island, Hawai`i [TMK (3) 8-2-001:072]. This facility will be adjacent to the existing Hawaii County Police Station (currently on parcel 084). The Hawai`i County Department of Public Works is overseeing the development project on County of Hawai`i land.

Fieldwork documented one newly-recorded historic agricultural site, later assigned State Site Number 50-10-47-27619. The site is comprised of four features: one wall, one terrace, and two mounds—all built of stacked or piled rock. Excavation took the form of 43 Shovel Probes (spanning the project area) and one Stratigraphic Trench (within the terrace). Soil stratigraphy was very uniform throughout, and cultural material was limited to modern debris, aside from a midden deposit within ST-1 that offers evidence of Historic-period construction. It is likely that all features within the project area were constructed between 1800 –1950.

All four of these historic features, as well as 50-10-47-27619 as a whole, have been assessed as significant under Criterion D of the Hawai`i State Register of Historic Places. The information contained within this site that is considered valuable to the historic record is has been documented. Based upon the results of this Inventory Survey, further archaeological procedures would not contribute a significant volume of additional data to the interpretation of the history of the project area or region. Following the SHPD approval of this report, no further archaeological work is recommended.

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INTRODUCTION

Scientific Consultant Services, Inc. conducted an Archaeological Inventory Survey at the request of Fleming & Associates, LLC (architects) on a 1.2587-acre vacant parcel. Proposed plans for the site involve developing a portion of this project area for the construction of a new, larger Hawaii County Police Station site in Captain Cook, Kealakekua and Kiloa 1st and 2nd Ahupua`a, South Kona District, Hawai`i Island, Hawai`i [TMK (3) 8-2-001:072] (Figures 1, 2, and 3). This facility will be adjacent to the existing Hawaii County Police Station (currently on parcel 084). The Hawai`i County Department of Public Works is overseeing the development project on County of Hawai`i land.

Fieldwork, consisting of systematic pedestrian survey, recordation, and excavation, was conducted on November 9, 10, 11, and 12 by SCS staff archaeologist Jon Wilson, B.A. A preliminary field inspection was conducted earlier in November by Glenn Escott, Ph.D. The Principle Investigator for this project was Robert L. Spear, Ph.D. Archaeological Inventory Survey of the project area was conducted to determine the presence/absence of archaeological deposits in surface and subsurface contexts. The ultimate goals were to determine if historically significant archaeological sites occurred on the parcel and to provide recommendations to the State Historic Preservation Division (SHPD) concerning site mitigation during planned development within the project area.

ENVIRONMENTAL SETTING

The project area consists of vacant land located at 82-6114 Mamalahoa Highway [(North) 19’ 29’ 19.8”; (West) 155’ 54’ 31.7”], between Captain Cook Fire Station (north) and the Captain Cook Post Office which borders the parcel on the south. Parcel 072 is roughly a rectangle, sloping from east to west, its down-slope border formed by the highway (Figures 4 and 5). An eight foot high, modern stone wall borders the highway and retains the upslope terrain of the project area. The east, *mauka* border is marked by a fenced-in coffee plantation. The north border is a partially-vacant parcel, 084, which has been disturbed by heavy machinery recently (Figure 6). The majority of parcel 084 houses the Fire Station, parking lot, and other services. The average elevation of the parcel is approximately 1511 feet above mean sea level and the Pacific Ocean is approximately five miles down slope. The gradient of the parcel increases in its eastern, *mauka* third, but otherwise is a gradual slope down to the highway.

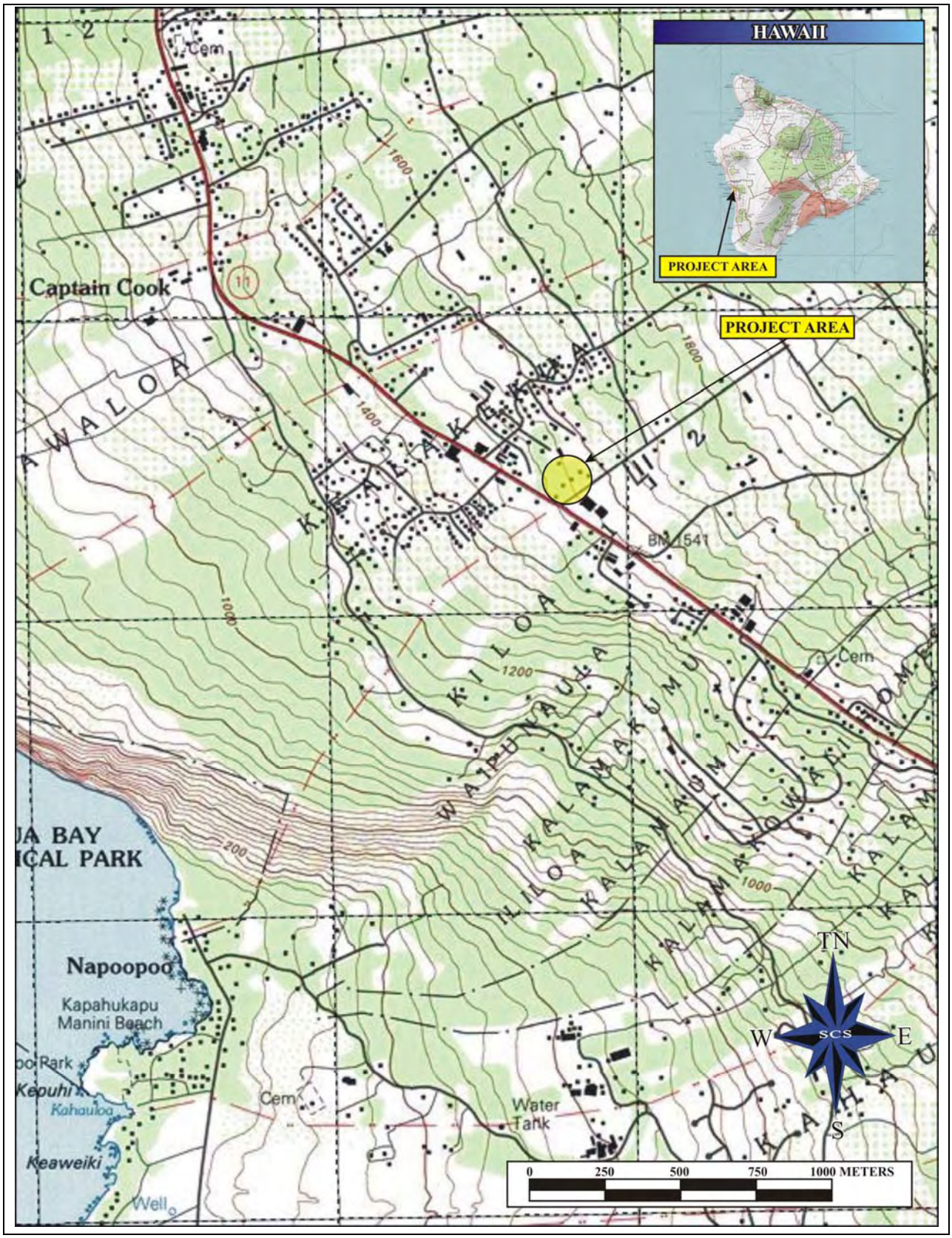

Figure 1: USGS Quadrangle Map Showing Project Area Location.

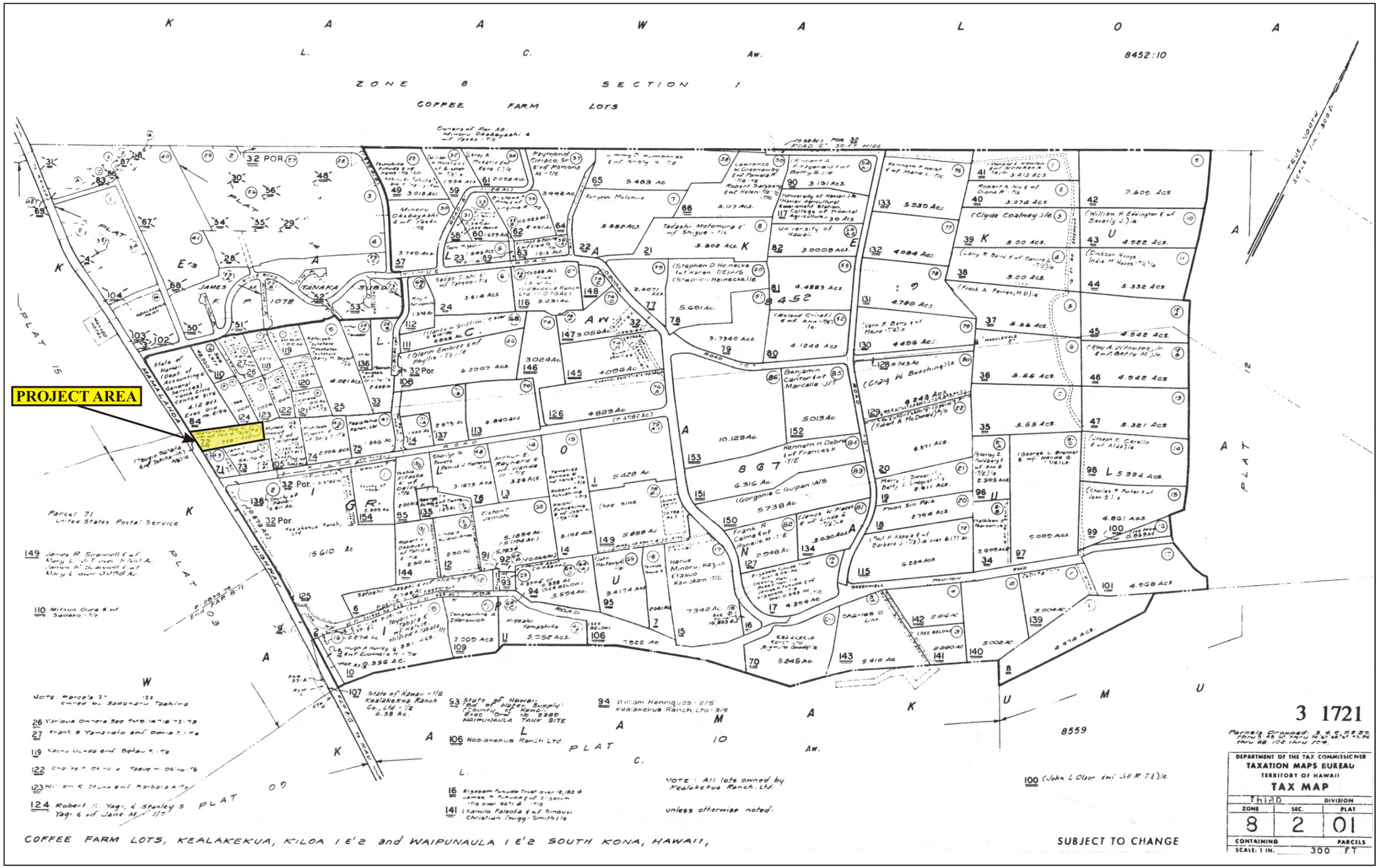

Figure 2: Tax Map Key [TMK] Showing Project Area Location.

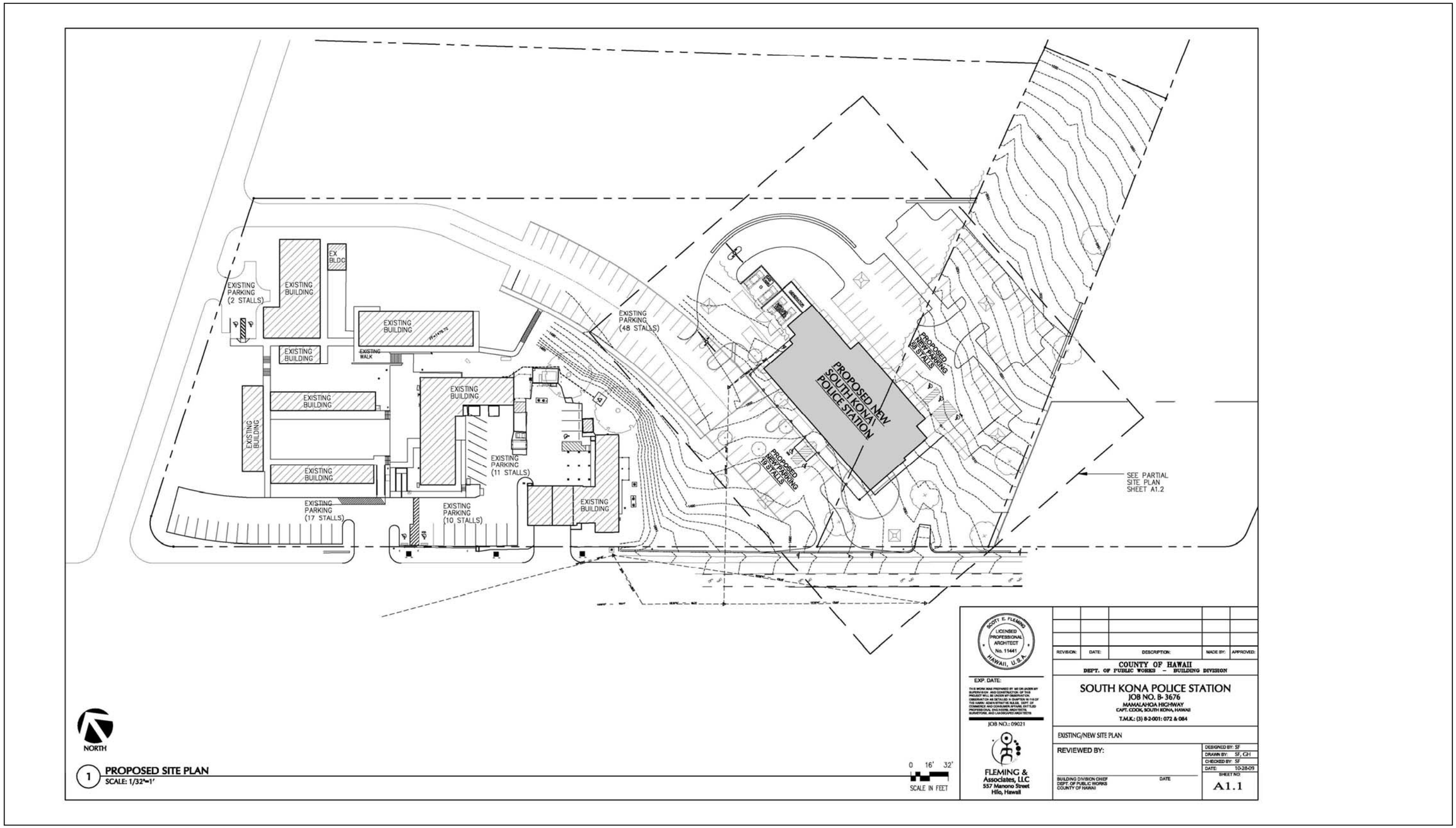

Figure 3: Development Plan View Map.

Figure 4: Southwest Corner of Project Area. View to Northeast.

Figure 5: Interior of Project Area. View Upslope to East.

Figure 6: Interior of Project Area Along Northern Border. View down slope to West.

Vegetation in the project area includes introduced grasses, coffee, banana; as well as trees including the native *kukui* (*Aleurites moluccana*) and introduced *Spathodea campanulata* (African tulip tree) which combine with mango and other species to form a fairly dense 40 ft. canopy. Soils within the project area, according to Foote *et al*. (1972:16), fall into the Honuaulu Series, specifically Honuaulu extremely stony silty clay loam (HVD) existing on 12 to 20 percent slopes. The Honuaulu Series is a well-drained soil formed from volcanic ash. It is 3 to 15 percent stone covered and mostly used for pasture and planting coffee, banana, macadamia nuts, citrus fruits, and avocado.

Hydrology of the project area is strictly through rainfall, as there are no streams or wells on the property. Annual rainfall for the area ranges between 30 and 40 inches. Daily temperatures vary throughout the year only 25 degrees in general, from a low of 65 degrees F in winter months to 90 degrees F in summer months (Price 1983:63).

TRADITIONAL AND HISTORIC SETTING

Archaeological settlement data indicates that initial colonization and occupation of the Hawaiian Islands first occurred on the windward sides of the main islands, with populations eventually settling into drier leeward areas at later periods (Kirch 1985). Archaeological dates for initial occupation of the Hawaiian Islands far pre-date accepted ranges gathered from palynological data. A more conservative estimate for initial occupation of the islands is the A.D. 9th century (Athens 1997), if one is to lay more credibility with the pollen record than the archaeological record. In the Waihe`e and Wai`ehu areas of Wailuku, Maui, Kirch (1985:87) notes that "a number of coastal dune midden sites have been reported, and at least one of these contained pearl-shell fishhooks similar to those from the Bellows Site, eroding from the wave-cut midden." (The Bellows site, located on the windward coast of O`ahu, has yielded the controversial data of occupation dates from A.D. 300 to 600 [Pearson *et al*. 1971], one of the earliest dated sites in the Hawaiian Islands. For the most part, these dates have now been diagnosed as problematic and are no longer considered valid.)

The earliest populations purportedly used local resources and seldom ventured into upland valleys. Cordy (in Creed 1993) suggests, however, that upper valley areas on windward coasts were likely populated before the A.D. 1100s. Coastal settlement was still dominant, but populations began exploiting and living in more upland *kula* zones. Greater population expansion to inland areas did not occur until the *c*. A.D. 12th century but continued through the 16th century. Large scale or intensive agricultural endeavors were implemented in association

with habitation. Coastal lands were used for settlement and taro was cultivated in near-coastal reaches and in the uplands.

KEALAKEKUA

Any discussion of the pre-Contact setting of Kealakekua Ahupua`a must first address Kealakekua Bay, the most important geographic and cultural feature in the region. At the time of western contact, the village of Ka`awaloa was a major settlement on the north shore of the bay. The ruling chief of the island, Kalani`opu`u, received Captain James Cook at his residence after the British explorer anchored his ships in the bay in January 1779. The small coastal area in Kealakekua *ahupua`a* on the south side of the bay was dominated by Hikiau *heiau* and its associated priestly complex, the center of the island's Makahiki rituals which focused on appeasements to the god Lono. The religious complex was surrounded by a high stone wall. South of the wall and extending around Napo`opo`o cove were the villages of Kiloa, Waipuna`ula, and Kalama (Ellis 1963:89); residences continued south along the coast to Ke`ei village.

Major population growth in the Kealakekua region, and expansion upslope, occurred from about A.D. 1150 to 1400 (Dye and Komori 1992; Dye 1994). At the earlier end of this date range, initial settlement focused around the bay, as source of a wide variety of ocean and near-shore resources, complemented by fresh water seeps and ponds at the coast, rich soils in nearby upland areas, and high rainfall for early cultivation. As Hawaiians settled into a new environment, they gradually expanded activities inland, developing farm field s on the lower slopes of Mauna Loa and reaching the vicinity of the project area. Over subsequent centuries, they built more and larger settlements along the coast and expanded and intensified their inland fields.

THE KONA FIELD SYSTEM

Spanning the upland slopes between Kailua and Kealakekua, the Kona Field System was a large complex of continuous agricultural fields that encompassed the present project area. It is formally defined as and area 18 miles along the coast by 3 miles *mauka-makai*, although agricultural remains extend beyond these boundaries in some areas. Soehren and Newman (1968) produced the first map of the field system, based on aerial photo interpretation and limited ground survey.

The archaeology of the Kona region is defined by the Kona Field System. Nearly every archaeological investigation between Kailua and Honaunau has dealt in some way with this

complex. The field system consists of four basic zones that extend from the coast to about 4,000 ft. amsl in the upland Kona forests. These zones are generally defined by elevation and rainfall, with variations dependent on sediment and geologic base (see Kelly 1983, Schilt 1984, and Burtchard 1996). The Bishop Museum investigations at the Amy B.H. Greenwell Garden (located 500 meters northwest of the subject property) are the most definitive work on the Kona Field System in the Kealakekua region.

EARLY POST-CONTACT PERIOD AND THE GREAT MAHELE

Kealakekua Bay was the site of the first protracted contact between Hawaiians and westerners. Much has been written about the arrival of Captain James Cook in 1779, his first encounters with the residents of the bay, and his ultimate demise. As one of the few protected natural harbors on the island, the bay was an attractive anchorage for western ships in need of provisioning. Visitors to Kealakekua in the last decades of the 18th century observed the settlements around the bay. James Cook estimated 350 houses and 2100 residents in 1779 (Yent *et al*. 2000:10). In 1793, George Vancouver recorded 200 houses along the half mile coastline at Napo`opo`o (*ibid*.), as well as extensive inland fields of sugar cane, taro, breadfruit, plantains, sweet potato, and *wauke* (paper mulberry) (Handy and Handy 1972:525).

The whaling industry, which began in the 1820s, brought more western contact to the region. Additionally, the arrival of Christian missionaries to Kealakekua in 1824 altered Hawaiian society as the several high chiefs were early converts. As the century progressed, disease, low birth rates, and outmigration upslope and to other growing ports in the islands took their toll on the Kealakekua population.

In 1848, commissioners of the Great Mahele instigated an extreme modification to traditional land tenure on all islands that resulted in a division of lands and a system of private ownership. The Mahele was based upon the principles of Western law. While a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian society into that of a market economy (Kuykendall Vol. I 1968:145, footnote 47, *et passim*; Daws 1968:111; Kame`eleihiwa 1992:169–170, 176). The dramatic shift from a subsistence economy to a market economy resulted in drastic changes to land tenure, among other practices. As a result, foreigners demanded private ownership of land to ensure their investments (Kuykendall Vol. I, 1968:145, *et passim*; Kame`eleihiwa 1992:178; Kelly 1998:4).

Once lands were made available and private ownership was instituted, native Hawaiians, including the *maka`ainana* (commoners), were able to claim land plots upon which they had been cultivating and living. Often, foreigners were simply just given lands by the *ali`i*. However, commoners would generally only make claims if they had first been made aware of the foreign procedures (which defined their *kuleana* lands, or Land Commission Awards). These claims could not include any previously cultivated or currently fallow land, *okipu*, stream fisheries, or many other natural resources necessary for traditional survival (Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). Awarded parcels were labeled as Land Commission Awards (LCAs). If occupation could be established through the testimony of witnesses, the petitioners were issued a Royal Patent number and could then take possession of the property. Commoners claiming house lots in Honolulu, Hilo, and Lahaina were required to pay commutation to the government before obtaining a Royal Patent for their awards (Chinen 1961:16). There are no LCAs for the project area parcel, however, LCAs within the immediate vicinity include various listings of traditional features (*lo`i*, fishponds, etc.)

There were no LCAs particular to the current project area or on the bordering parcel 084. The *ahupua`a* of Kealakekua and portions of adjacent Ka`awaloa were awarded to the high chief Keohokalole as LCA 8452.

PROJECT AREA RECENT HISTORY

The trend of pre-Contact, into Historic-era, spread of agricultural pursuits from the coast to the upland regions applies to the project area. The history of this 1.3-acre parcel up to the present, generally reflects Kealakekua upland regions as a whole. Historic to modern-era use of the project area was mainly residential and for coffee planting. A September 10, 2009 letter from Geometrician Associates, LLC addressed to SHPD, succinctly summarizes a Phase I ESA conducted after the County of Hawai`i purchased parcel 072:

> . . . the property was previously owned by Kealakekua Ranch, Ltd. It was leased out through the years to various tenants for residential and some agricultural usage. The subject property was transferred on February 26, 2008 to the County of Hawai`i. The property had a single story wooden structure built in 1939, a small lean-to type structure and a small wooden shed. The building was approximately 998 square feet. The wooden shed was approximately 425 square feet. The buildings were demolished by B & M Construction Co. in February 2008, according to Meg Greenwell, representative of the Kealakekua Ranch, LTD. The property also had a cesspool to service the house. It was filled and closed according to regulations in February 2008, prior to closing the transfer of the property to the County of Hawai`i. (Terry 2009)

PREVIOUS ARCHAEOLOGY

No previous studies within the SHPD archives document archaeological procedures on the subject property, TMK parcel 072. However, nearby studies inform the present findings. The vast majority of these studies take place *makai* of the current project area, particularly concentrating on the rich history surrounding Kealakekua Bay (Figure 6a).

Hammatt (1989) conducted an Archaeological Reconnaissance of a 3-acre parcel in Captain Cook (a portion of parcel 125). This study was the closest previous archaeology conducted to the current project area (Hammatt's study located 200 m upslope). Hammatt's findings were negative; the parcel had a very similar history to the current project area (1989:i)

The current study area is several hundred meters *mauka* of the regional air photo interpretation study conducted by Soehren and Newman (1968). They identified fifteen sites, and numerous Kona Field system *kuaiwi* features associated with the vast agricultural fields above Kealakekua Bay. The bulk of their report is devoted to discussions of the Kona Field System and the importance of preserving sections of the system's features as part of the significant Kealakekua Bay Historic District.

Nine other archaeological studies have been reported near the current study parcel (Barrera 1990; Head 1994; Rechtman 1999; Rechtman n.d.; Rechtman and Dougherty 2000; Rechtman and Dougherty n.d.; Rechtman 2002; Walker *et al*. 1991; Tomonari-Tuggle 2004).

The results of these previous studies were consistent with one another. The area *makai* of the current study parcel was once apart of an elaborate pre-Contact and early historic agricultural field complex that was observed by early explorers and missionaries. The more *mauka* portions of these fields showed the most amounts of Historic Period and modern disturbance, primarily as a result of ranching.

The most extensive of the earlier studies was a survey conducted in 1990 by PHRI (Walker *et al*. 1991). The investigators recorded numerous sites on the bluff northeast (over two miles *makai*) of the current study area. Five of these sites (SIHP Sites 13657, 13658, 13659, 14160, and 14161) were later investigated by Rechtman (1999, n.d.), and included three habitation sites, a historic wall, and a set of agricultural features defined as part of the Kona Field System. These studies also noted several general settlement patterns, including the obvious correlation between good agricultural soils and agricultural features. The majority of the

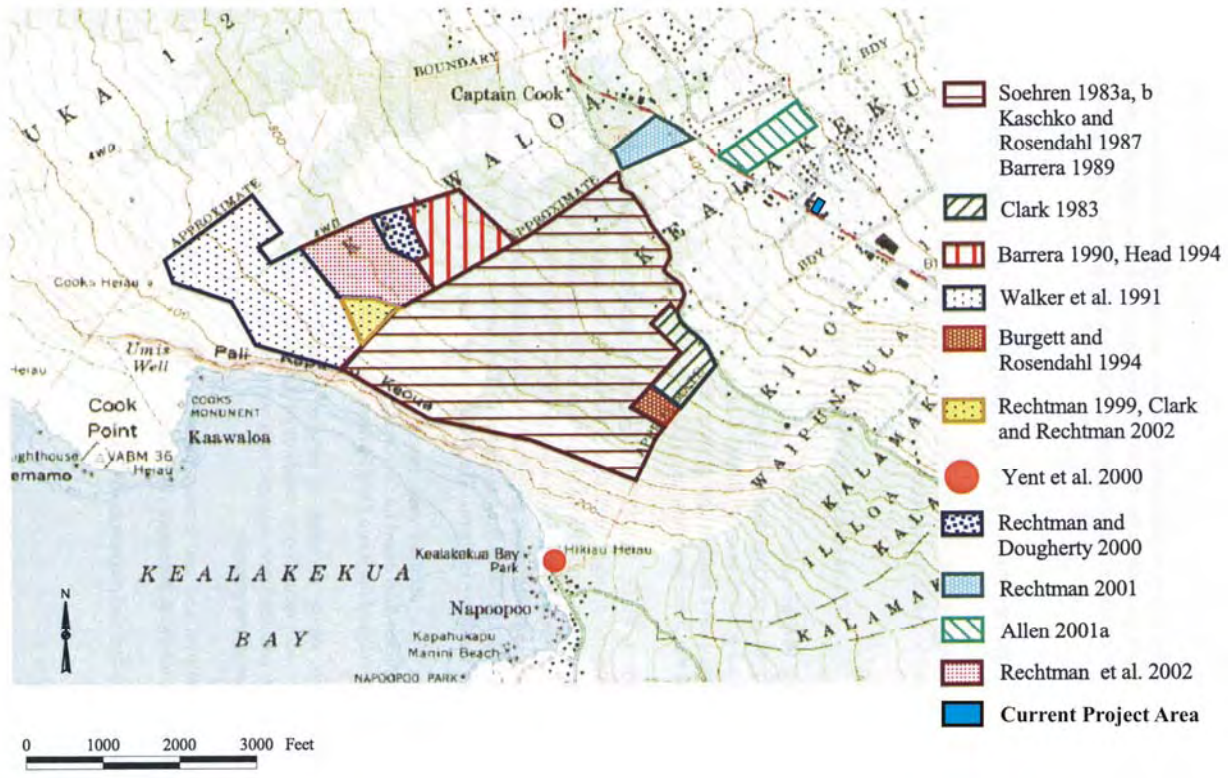

Figure 6a: Previous Archaeology Map of Selected Former Studies in the Region (Adapted from Tomonari-Tuggle 2004)

habitation sites (including temporary habitations) were located on *`a`a*. They concluded that the few habitation sites within the formal agricultural field were "most likely temporary shelters used in the course of daily agricultural activities" (Walker *et al*. 1991).

Farther from the current study area, but by far the most concentrated location of previous archaeological investigation, is the Kealakekua Bay Historic District. This area was placed on the National Register of Historic Places in 1973. The Historic Park encompasses 218 acres and includes key coastal archaeological features of the District. The cliff portion of the park is almost 2,000 ft. seaward of the western boundary of Captain Cook Ranch; the area between the park boundary and the Captain Cook Ranch is designated conservation.

EXPECTED FINDINGS

Prior to fieldwork, and based on all available physiographic, archaeological, and historical evidence, SCS estimated a low probability of finding pre-Contact (pre-1779 A.D.)

features on the subject parcel—aside from potential agricultural remnants of the Kona Field System. A greater chance existed to document Historic-era (post-Contact) settlement and agricultural features, including habitation features (*e.g.*, enclosures, walls, platforms, alignments), agricultural sites (*e.g.*, terraces, alignments, and mounds), ranching sites, and the unexpected, but possible, existence of unmarked burial areas (again, historic burial areas being a likelier find than pre-Contact). This probability of expected findings would increase if the project area was larger than 1.3 acres, or if it extended more *makai*.

METHODOLOGY

Inventory Survey was conducted during the course of four days in November 2009. The primary goal of this project was to determine the presence or absence of archaeological sites within the project area through systematic surface survey and representative subsurface testing. Research was also directed towards understanding the temporal placement and function of any identified sites and their component features. All aspects of field work conducted by SCS were documented via field notes, photographs, stratigraphic profiling, plan view maps, etc.

FIELD METHODS

There were five main field components to this project: pedestrian survey of the entire project area; plotting located features on a project area map; clearing features of vegetation; hand excavation; recording the results through photographs, plan view maps, and profile graphs. Transect lines were established in a north-south direction (cross-slope), and the entire property was systematically walked by SCS crew. When any structures, artifacts, or intriguing topographical changes were identified, they were flagged and plotted on an overall site map. Temporary site numbers were converted to State Site Numbers upon a cursory project review by SHPD following the completion of fieldwork. Visibility was average for the majority of the property, although ground visibility within the highest grass of the western boundary area and the dense tree/shrub growth of the southern border of the parcel was only achieved through hand clearing.

Forty-four hand excavations were conducted in the form of 43 Shovel Probes (SP) and one Stratigraphic Trench (ST-1). Excavation of the majority of shovel probes served a two-fold purpose: 1) to document representative subsurface soil stratigraphy, and 2) to recover any subsurface cultural material observed. Shovel Probe 31 and ST-1 were placed within recorded features with the intent to recover cultural material that might reveal the temporal and functional context of the feature.

Soil and sediments were described, sketched, and photographed using standard archaeological procedures (see RESULTS section, below). The results revealed a fairly homogenous soil matrix. While no cultural materials were collected from any Shovel Probe, materials were collected from ST-1. The entire removed matrix of ST-1 was screened through 1/8 inch mesh, whereas only odd numbered SPs were screened (with the exception of SP-30) due to the overall lack of material. Few of the 43 SPs revealed any cultural material; of those that did, none of the material was found in a provenience that was free of commingling with modern debris. Forty-two of the total Shovel Probes showed an extremely homogenous matrix represented by a single profile within this report. SP-31, within Feature 2, was the only deviation (see profile under "RESULTS", below).

LABORATORY METHODS

Laboratory work included digital drafting of plan view maps and stratigraphic profiles for reporting purposes and the digitizing of all photographs and maps for archival purposes. Only the cultural material found within ST-1 was collected. Analysis of that material is summarized below. All field notes, maps, midden, and photographs pertaining to this project are currently being curated at the SCS facilities in Honolulu.

ARCHAEOLOGICAL INVENTORY SURVEY RESULTS

PEDESTRIAN SURVEY

A 100-percent pedestrian survey of the project area revealed the presence of four historic-period surface features (Table 1). These features are all related remnants of post-Contact agricultural activity on parcel 72, and have been condensed into components of one site, 50-10-47-27619, due to their similar form, function, age, and spatial relationship (Figure 7).

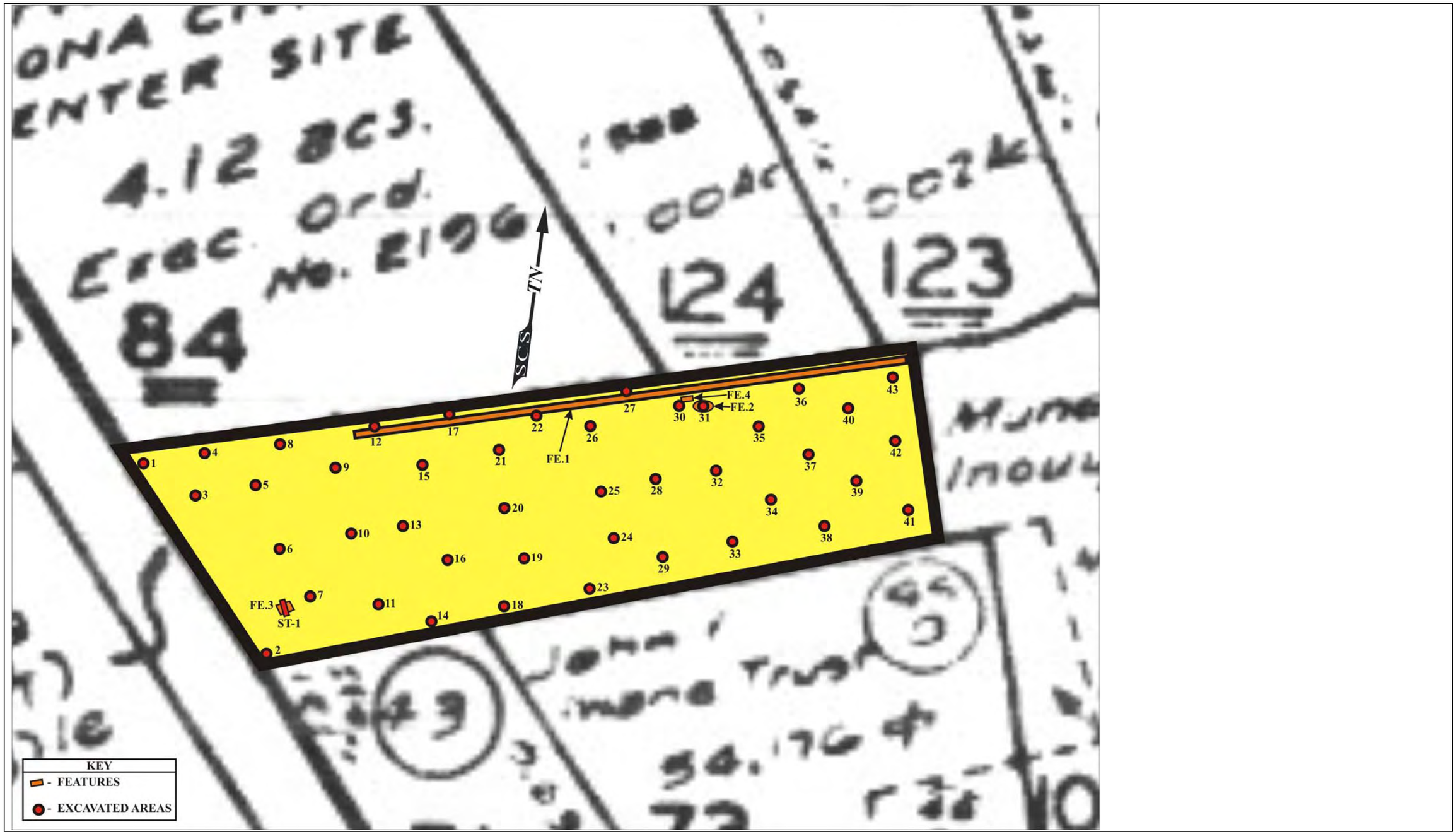

Figure 7: Project Area Plan View Map.

Table 1: Total Features within TMK (3) 8-2-001: 072 (all of which comprise State Site Number 50-10-47-27619)

Feature No.	Form	Notes on form	Dimensions: L x W x H (in meters)	Age	Function
1	Stacked rock wall	Up to five courses high; majority has tumbled	60.0 x 0.5 x 0.6	Historic construction and use	Historic agriculture / land boundary division
2	Piled cobble mound	Oval-shaped with no stacked sections. Cobbles loosely piled high	6.7 x 3.3 x 0.6	Historic construction and use	Historic agriculture / clearing mound
3	Piled cobble terrace	Rectangular and low, averaging only two to three courses.	8.5 x 3.8 x 0.3	Historic construction and use	Historic agriculture: planting area / erosion control
4	Piled cobble mound	Roughly rectangular shape with stacked facing on north and west perimeter	5.0 x 4.0 x 0.6	Historic construction and use	Historic agriculture / clearing

Feature 1: Stacked rock bi-faced wall

FORM Rock wall of stacked boulders
FUNCTION: Property boundary marker
AGE: Historic
DIMENSIONS: Length: 60.00 m; Width: 0.50 m; Height: 0.60 m
CONDITION: Fair: majority has tumbled sections
SURFACE ARTIFACTS: None
EXCAVATION: Shovel Probes 12, 17, 22, 27 abut the wall

DESCRIPTION: Feature 1 is a stacked-boulder wall that roughly forms the northern border between parcels 72 and 84 (Figure 8). The average boulder used in construction is large, with roughly a 40 cm diameter; the wall averages four courses. The wall was likely constructed in times of post-Contact agricultural pursuits on the parcel, as a land boundary marker. Ten meters north of the wall, the land on parcel 84 has been extensively bulldozed, and 20 meters north of this bulldozed area is the parking lot servicing the buildings on parcel 84. The wall extends upslope past the project area's eastern boundary. It is probable that the wall extended down slope to the present highway, but that section is now missing. Shovel Probes 12, 17, 22, and 27 abut Feature 1 and revealed that the foundation rests on the natural ground surface. The stratigraphy revealed was the uniform soil layers found throughout the project area (detailed below).

Figure 8: Feature 1. View to Northeast.

Feature 2: Piled cobble mound

FORM	Mound
FUNCTION:	Agricultural clearing pile
AGE:	Historic
DIMENSIONS:	Length: 6.70 m; Width: up to 3.30 m; Height: up to 0.60 m
CONDITION:	Fair
SURFACE ARTIFACTS:	None
EXCAVATION:	SP-31

DESCRIPTION: Feature 2 is a large historic mound that likely served simply as a concentration of placed / tossed rocks as the surrounding vicinity was cleared for planting (Figure 9).

Shovel Probe 31 (SP-31)
POSITION: Within the center of the Feature 2 clearing mound (see Figure 7)
PURPOSE: 1) To investigate the subsurface architecture of the site; 2) cultural material recovery that could reveal function; 3) to eliminate the possibility that this could be a burial marker.
DIMENSIONS (in meters): 0.50 by 0.50
BASE OF EXCAVATION DEPTH (in meters below surface): 0.90
CULTURAL MATERIAL: none

SUMMARY: SP-31, as expected, did not produce cultural material. In this case, the lack of material does support the estimated function of Feature 2, that of a clearing mound. The stratigraphy in Figure 10 shows the loose cobble-filled architecture of the mound that rests upon the natural ground surface.

Feature 3: Piled cobble terrace

FORM	terrace
FUNCTION:	Agricultural planting / erosion control
AGE:	Historic
DIMENSIONS:	Length: 8.50 m; Width: up to 3.80 m; Height: up to 0.30 m
CONDITION:	Fair
SURFACE ARTIFACTS:	None
EXCAVATION:	ST-1

DESCRIPTION: Feature 3 is a low terrace in the southwestern portion of the project area (see Figures 7 and 11). It is faced with two to three stacked cobbles on its northern edge and fades into the natural ground surface on its other borders. The terrace appears to have been constructed as a soil retention feature to prevent upslope crops from erosion damage. Coffee plants are dense in this area and the feature may have also served modern planting. ST-1 offers evidence of the historic-era construction of this feature.

Figure 9: Feature 2. View to East.

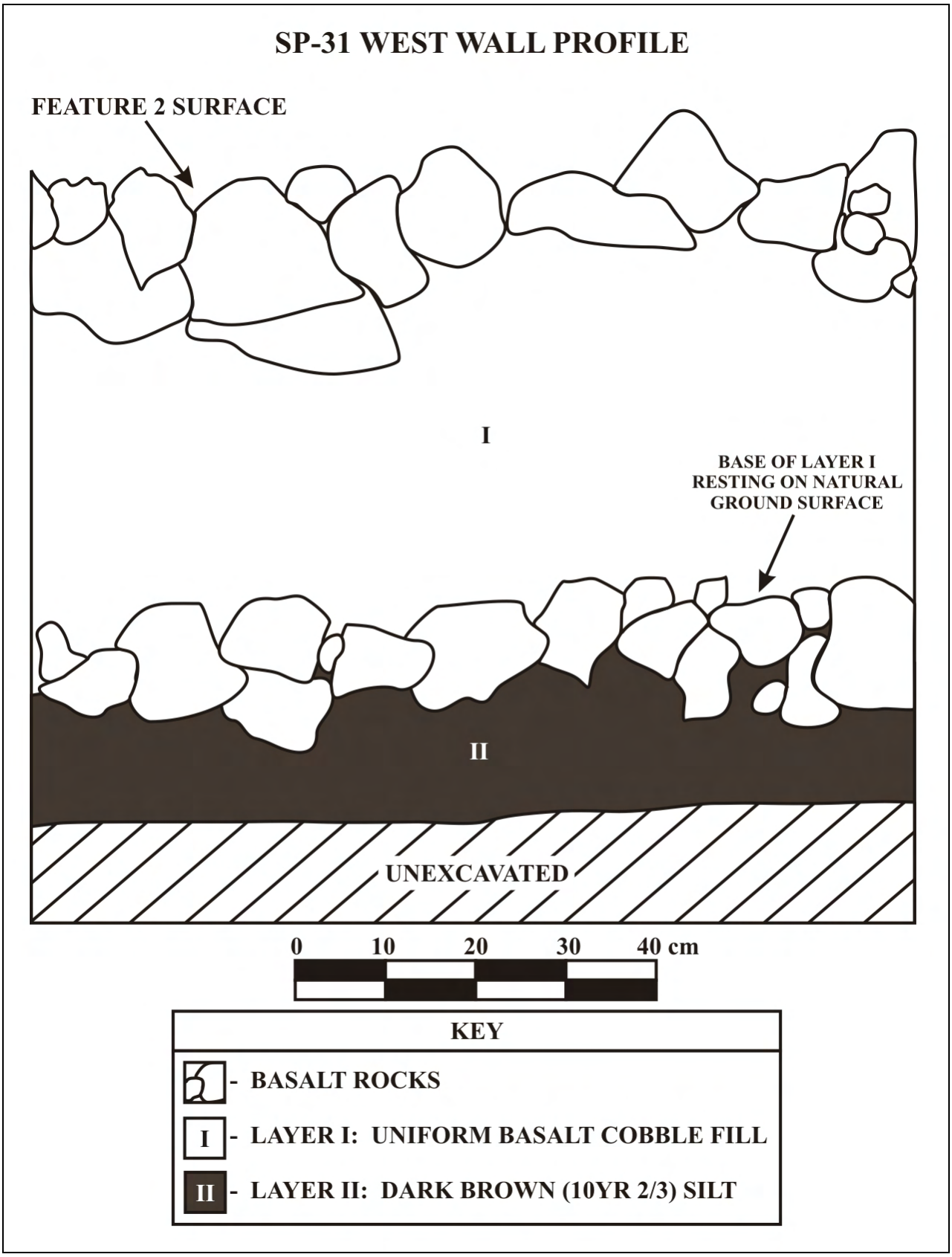

Figure 10: SP-31 Profile.

Figure 11: Feature 3 Terrace. View to East.

Stratigraphic Trench 1 (ST-1) (Figure 12)
POSITION: Bisecting the center of the feature, a roughly north-south orientation
PURPOSE: 1) To investigate the subsurface architecture of the site; 2) cultural material recovery that could help to support estimated function
DIMENSIONS (in meters): 4.00 by 0.50
BASE OF EXCAVATION DEPTH (in meters below surface): 0.40
CULTURAL MATERIAL: native marine shell, introduced marine shell, sawed pig bone, rusted metal fragments, modern debris

SUMMARY: ST-1 offers proof of the post-Contact, rock feature construction efforts within the project area. The cultural material found within this excavation included an *insitu* food midden pocket that was positioned near the base of the feature. In other words, the builders of the terrace left remnants of a meal, or several meals, behind as they gradually constructed the piled rocks and planted the area around it. Modern debris has filtered down from the surface of this feature to 15 cmbs, but not at the 25-35 cmbs depth of this midden concentration. The shells within this subsurface feature are mostly too large to have filtered downward; they are built in to the feature. The marine shell found includes native species (*Cellana exarata*, *Nerita picea*) commingled with the introduced *Crassostrea gigas*, an oyster species imported into Hawaii as a food item in 1926.

A representative sample of the marine shell within the Feature 3 midden concentration is shown in Figure 13.

Feature 4: Piled cobble mound

FORM	Mound
FUNCTION:	Agricultural clearing pile
AGE:	Historic
DIMENSIONS:	Length: 5.00 m; Width: up to 4.00 m; Height: up to 0.60 m
CONDITION:	Poor
SURFACE ARTIFACTS:	None
EXCAVATION:	SP-30

DESCRIPTION: Feature 4 is a historic-era mound that likely served as a concentration of placed / tossed rocks as the surrounding vicinity was cleared for planting. It is smaller, lower, and more rectangular in shape the Feature 2 mound. Shovel Probe 30 was placed at the southwest corner of the mound with the intent to recover any cultural material that may have eroded off the feature, and was deposited at the base of the mound. Nothing was found, and the subsurface stratigraphy matched that of the project area as a whole (see Figures 14 and 15).

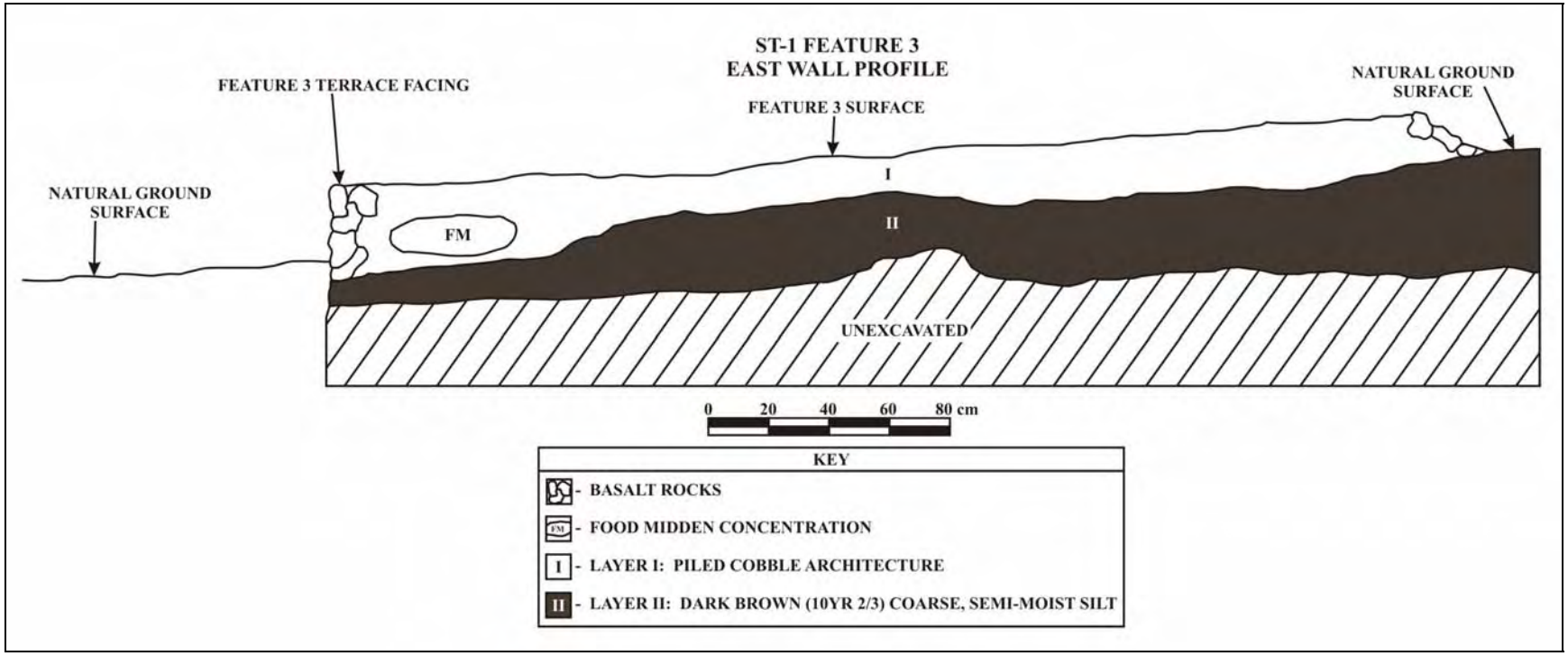

Figure 12: ST-1 Profile.

Figure 13: Sample of Marine Species Found Within ST-1 (From left to right: *Cellana exarata, Nerita picea, Crassostrea gigas*)

Figure 14: SP-25 Soil Stratigraphy Photograph. South Wall View.

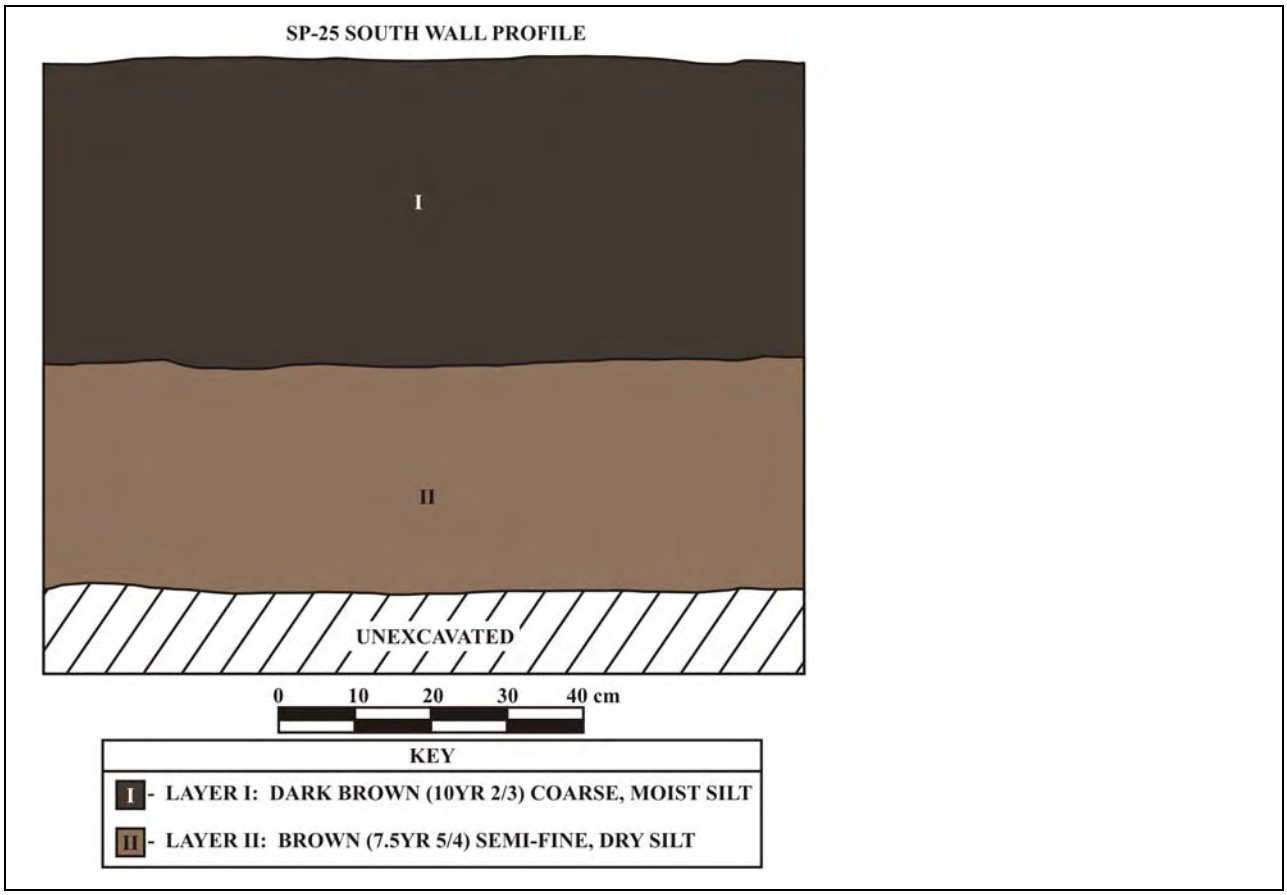

Figure 15: SP-25 Profile.

SIGNIFICANCE ASSESSMENT AND RECOMMENDATIONS

One historic agricultural site, 50-10-47-27619, with four component features, was documented in the project area. All four features are remnants of post-Contact activity on the land. It is likely that all features listed were constructed between 1800 –1950.

These features have been evaluated for significance according to the criteria established for the Hawai`i State Register of Historic Places. The five criteria are classified below:

Criterion A: Site is associated with events that have made a significant contribution to the broad patterns of our history

Criterion B: Site is associated with the lives of persons significant to our past

Criterion C: Site is an excellent site type; embodies distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual construction

Criterion D: Site has yielded or has the potential to yield information important in prehistory or history

Criterion E: Site has cultural significance to an ethnic group; examples include religious structures, burials, major traditional trails, and traditional cultural places

All four of these historic features, as well as 50-10-47-27619 as a whole, have been assessed as significant under Criterion D. Based upon the results of this Inventory Survey, further archaeological procedures would not contribute a significant volume of additional data to the interpretation of the history of the project area or region. A relatively large percentage of feature volume was excavated during this survey phase, and further excavation would expend resources for redundant results. Following the SHPD approval of this AIS, no further archaeological work is recommended.

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H-2031
H-1399

ENVIRONMENTAL ASSESSMENT

South Kona Police Station

TMK: (3rd) 8-2-001:072 and 084
South Kona District, Hawai‘i Island, State of Hawai‘i

APPENDIX 3
Traffic Impact Assessment Report

Phillip Rowell and Associates
47-273 'D' Hui Iwa Street Kaneohe, Hawaii 96744 Phone: (808) 239-8206 FAX: (808) 239-4175 Email:prowell@hawiiantel.net

January 6, 2010

Mr. Ron Terry
P.O. Box 396
Hilo, Hawaii 96721

Re: **Traffic Impact Assessment Report**
South Kona Police Station in Captain Cook, Island of Hawaii
TMK: 8-2-001:072, 084

Dear Ron:

Phillip Rowell and Associates have completed the following Traffic Impact Assessment Report (TIAR) for the proposed police station in Captain Cook. The following report is presented in the following format:

A. Project Location and Description
B. Purpose and Objective of Study
C. Methodology
D. Description of Existing Streets and Intersection Controls
E. Existing Peak Hour Traffic Volumes
F. Level-of-Service Concept
G. Existing Levels-of-Service
H. Background Traffic Projections
I. Project Trip Generation
J. Background Plus Project Traffic Projections
K. Impact Analysis of Background Plus Project Conditions
L. Mitigation
M. Summary and Conclusions

A. Project Location and Description

The proposed project is located along the east side of Mamalahoa Highway and south of Kinue Road in Captain Cooke. See Attachment A.

The proposed action is the construction of a new police station and parking lot. The new building will have a floor area of 21,494 square feet. A preliminary site plan for the project is provided as Attachment B. For purposes of preparing this traffic study, it was assumed that the existing police station building will remain and will be used in the future.

Access to and egress from the project will be via a new driveway along the east side of Mamalahoa Highway approximately 250 feet south of the existing driveway to the civic center. This new driveway will connect to an expansion of the existing over-flow parking lot.

B. Purpose and Objective of Study

1. Quantify and describe the traffic related characteristics of the proposed project.

2. Identify potential deficiencies adjacent to the project that will impact traffic operations in the vicinity of the proposed project.

C. Methodology

1. *Define the Study Area*

The first step in defining the study area was to estimate the number of peak hour trips that the proposed project will generate. It was estimated that the project will generate 48 trips during the morning peak hour and 62 trips during the afternoon peak hour. This implies that the scope of the traffic assessment could be limited to an "access location and design review" analysis as described by the Institute of Transportation Engineers[1]. Accordingly, the traffic impact assessment is limited to the following intersections:

a. Mamalahoa Highway at Kinue Road
b. Mamalahoa Highway at Kamakani Street
c. Mamalahoa Highway at New Project Driveway

2. *Analyze Existing Traffic Conditions*

Existing traffic volumes at the existing intersections were estimated from manual traffic counts at the existing intersections. These counts were performed in October 2009.

The intersection configuration and right-of-way controls were verified during a field reconnaissance of the study area during October 2009. Existing traffic operating conditions of the study intersections were determined using the methodology described in the 2000 *Highway Capacity Manual* (HCM)[2].

3. *Estimate Horizon Year Background Traffic Projections*

Background traffic conditions are defined as future traffic conditions <u>without</u> the proposed project. The design horizon year does not necessarily represent the project completion date. It is a date for which future background traffic projections were estimated. For this project, we have used a design, or horizon, year of 2015. Horizon year background traffic conditions were estimated using a background traffic growth factor.

4. *Estimate Project-Related Traffic Characteristics*

The number of peak-hour trips that the proposed project will generate was estimated using standard trip generation procedures outlined in the *Trip Generation Handbook*[3] and data provided in *Trip Generation*[4]. These trips were distributed and assigned based on the available approach and departure routes.

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[1] Institute of Transportation Engineers, Transportation and Land Development, Washington, D.C., page 3-6

[2] *Highway Capacity Manual*, Institute of Transportation Engineers, Washington, D.C., 2000

[3] *Trip Generation Handbook*, Institute of Transportation Engineers, Washington, D.C., 1998

[4] *Trip Generation*, Institute of Transportation Engineers, Washington, D.C., 2003

5. *Analyze Project Related Traffic Impacts*

The project-related traffic was then superimposed on background traffic volumes. The traffic impacts of the project were assessed by analyzing the future levels-of-service without and with project generated traffic. The purpose of this analysis was to identify potential operational deficiencies in the vicinity of the proposed project and to quantify changes in the intersection levels-of-service as a result of project generated traffic.

D. Description of Existing Streets and Intersection Controls

The existing lane configuration and right-of-way controls are summarized in Attachment C.

Mamalahoa Highway is a major north-south highway in the vicinity of the project. The roadway has one lane each direction and a median left turn lane along the entire section adjacent to the existing civic center and proposed project. The posted speed limit is 30 miles per hour. In the vicinity of the proposed project, Mamalahoa Highway is under the jurisdiction of the County of Hawaii.

All the study intersections are unsignalized and have separate left turn storage lanes. Between the intersections, the median is a two-way-left-turn lane.

E. Existing Peak Hour Traffic Volumes

The existing morning and afternoon peak hour traffic volumes are summarized in Attachment C.

1. The traffic counts include buses, trucks and other large vehicles. Mopeds and bicycles are not included.

2. Pedestrian activity was negligible.

F. Level-of-Service Concept

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in Table 1. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

Table 1 Level-of-Service Definitions for Signalized Intersections[1]

Level of Service	Interpretation	Volume-to-Capacity Ratio[2]	Stopped Delay (Seconds)
A, B	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<20.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	20.1-35.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801-0.900	35.1-55.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901-1.000	55.1-80.0
F	Total breakdown with stop-and-go operation	>1.001	>80.0

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. Table 2 summarizes the definitions for level-of-service and the corresponding delay.

Table 2 Level-of-Service Definitions for Unsignalized Intersections[1]

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	<10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	See note (2) below	>50.1

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

G. Existing Levels-of-Service

The existing levels-of-service of the existing study intersections are summarized in Table 3. Shown in the table are the delays and levels-of-service of the controlled lane groups. The eastbound approach of Kamakani Street to Mamalahoa Highway operates at Level-of-Service E, but all the remaining lane groups operate at Level-of-Service C, or better. This implies that traffic along Mamalahoa Highway operates at a good level-of-service in the vicinity of the proposed project.

Table 3 Existing Levels-of-Service

Intersection, Approach and Movement	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
Mamalahoa Highway at Kinue Street				
Westbound Left & Right	17.6	C	14.6	B
Southbound Left	9.5	A	8.4	A
Mamalahoa Highway at Kamakani Street & Existing Driveway				
Eastbound Left, Thru & Right	28.7	E	22.4	C
Westbound Left, Thru & Right	20.4	C	18.7	C
Northbound Left	7.9	A	9.1	A
Southbound Left	9.5	A	8.2	A

NOTES:
1. V/C ratio is not calculated for unsignalized intersections.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

H. Background Traffic Projections

Background traffic projections are defined as future background traffic conditions without the proposed project. The background growth rate was estimated to be comparable to the growth of population in the area. Data provided in the Hawaii County Data Book indicates that population in South Kona will increase from11,414 to 12,681 between 2010 and 2015. This represents an annual growth rate of 2% per year. This growth rate was used to estimate background traffic growth between 2009 and 2015. The growth factor was calculated using the following formula:

$$F = (1 + i)^n$$

where F = Growth Factor
i = Average annual growth rate, or 0.016
n = Growth period in years

The background growth factor was applied to the estimated northbound and southbound through traffic along Mamalahoa Highway. The background growth and 2015 background traffic projections are shown in Attachment D.

I. Project Trip Generation

Future traffic volumes generated by a project are typically estimated using the methodology described in the *Trip Generation Handbook*[5] and data provided in *Trip Generation*[6]. This method uses trip generation rates to estimate the number of trips that the project will generate during the peak hours of the project and along the adjacent street

The assumptions used for the trip generation analysis are:

[5] Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., 1998, p. 7-12

[6] Institute of Transportation Engineers, *Trip Generation, 7th Edition,* Washington, D.C., 2003

1. The proposed police station will have a floor area of 21,494 square feet. This area was obtained from the preliminary plans for the proposed building.

2. The proposed police station will be part of the civic center which consists of several buildings providing various functions. Therefore, it was assumed that the new building will have traffic characteristics comparable to a "government office complex" as defined by the Institute of Transportation Engineers. The Institute of Transportation Engineers defines a government office complex as follows:

   A government office complex is a related group of buildings where a variety if functions of a city, county, state, federal, or other governmental unit, or multiple government units are carried out.

The trip generation calculations are summarized in Table 4. As shown, the proposed project will generate 42 inbound and 6 outbound trips during the morning peak hour. During the afternoon peak hour, the project will generate 19 inbound and 43 outbound trips.

Table 4 Trip Generation Calculations for Proposed Project

Time Period	Direction	Government Office Complex		
		Rate or %[1]	1.000 SF	Trips
AM Peak Hour	Total	2.10	21.494	48
	In	89%		42
	Out	11%		6
PM Peak Hour	Total	2.85		62
	In	31%		19
	Out	69%		43

NOTES:
(1) Institute of Transportation Engineers, *Trip Generation*, Seventh Edition, 2003, pages 1246 and 1247

The project generated traffic was distributed and assigned based on the existing approach and departure patterns of traffic at the study intersections as determined from the traffic counts. The project trip assignments are shown on Attachment E.

As previously noted, the new driveway and parking lot will connect to the existing over-flow parking lot. Traffic using this parking lot now uses Kinue Road. With this new connection, parkers can use the new driveway to access Mamalahoa Highway directly. The traffic volumes were adjusted to reflect this new connection. These adjustments are shown in the traffic projection worksheets.

J. Background Plus Project Projections

Background plus project traffic projections were estimated by superimposing the peak hourly traffic generated by the proposed project on the background (without project) peak hour traffic projections. This assumes that the peak hourly trips generated by the project coincide with the peak hour of the adjacent street. This represents a worse-case condition as it assumes that the peak hours of all the intersections and the peak hours of the study project coincide and that the study project is 100% occupied. The resulting background plus project peak hour traffic projections are shown in Attachment F. The traffic projection worksheets are provided as Attachment G.

K. Traffic Impact Analysis

Level-of-Service Analysis

1. Synchro 6 was used to perform the level-of-service analyses. This package uses the *Highway Capacity Manual* methodology.

2. As the *Highway Capacity Manual* defines level-of-service by delay, we have used the same definitions.

The results of the level-of-service analysis are summarized in Table 5. Shown are the average vehicle delays and the levels-of-service of each lane group.

Table 5 Existing Levels-of-Service

	AM Peak Hour				PM Peak Hour			
	Without Project		With Project		Without Project		With Project	
Intersection, Approach and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Mamalahoa Highway at Kinue Road								
Westbound Left & Right	19.9	C	19.7	C	16.2	B	15.8	C
Southbound Left	9.9	A	9.8	A	8.6	A	8.6	A
Mamalahoa Highway at Kamakani Street & Existing Driveway								
Eastbound Left, Thru & Right	36.0	E	39.4	E	26.5	D	28.6	D
Westbound Left, Thru & Right	23.6	C	24.7	C	21.7	C	23.1	C
Northbound Left	8.0	A	8.1	A	9.4	A	9.6	A
Southbound Left	9.9	A	9.9	A	8.3	A	8.4	A
Mamalahoa Highway at New Project Driveway								
Westbound Left & Right			16.4	C			14.3	B
Southbound Left			2.1	A			8.8	A

NOTES:
1. V/C ratio is not calculated for unsignalized intersections.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

As shown, the eastbound approach of Kamakani Street to Mamalahoa Highway will operate at Level-of-Service E, which is the same as the existing level-of-service, during the morning peak hour and Level-of-Service D during the afternoon peak hour. All the remaining controlled lane groups will operate at Level-of-Service C, or better. It should also be noted that there are no changes in the level-of-service of any lane group as a result of project generated traffic except the westbound approach of Kinue Road at Mamalahoa where the level-of-service changes from Level-of-Service B to Level-of-Service C.

L. Mitigation

Level-of-Service D is generally considered to be the minimum acceptable peak hour level-of-service for urban intersections.[7] It is generally accepted that side street approaches and minor movements, such as left turn lanes, may operate at Level-of-Service E or F for short periods, especially if the volume-to-capacity ratio indicates a higher Level-of-Service as this implies that the long delay and therefore the low Level-of-Service is a result of the traffic signal cycle length rather than a lane deficiency. However, the subject intersection is not signalized and methodology for unsignalized intersections does not calculate the volume-to-capacity ratio.

Accordingly, we have used the Institute of Transportation Engineers standard that a Level-of-Service D is the minimum acceptable level-of-service for the overall intersection for a signalized intersection or the major lane groups at an unsignalized intersection. If project generated traffic causes the level-of-service to drop below Level-of-Service D, then mitigation should be provided to improve the level-of-service to Level-of-Service D, or better. Minor movements, such a left turns and side street approaches may operate at Level-of-Service E for short periods. "Level-of-Service E is sometimes tolerated for minor movements such as left turns when there are no feasible mitigating measures or if it helps maintain the main through movements at acceptable levels-of-service."

As all controlled traffic movements except the eastbound approach of Kamakani Street, which is considered a minor or side street approach, will operate at Level-of-Service D, or better, no mitigation is recommended.

M. Summary and Conclusions

The conclusions of the traffic impact assessment are:

1. The proposed project is a new police station that will be located along the east side of Mamalahoa Highway south of Kinue Road in Captain Cook. The existing parking lot for the civic center will be expanded and a new parking lot constructed behind this parking lot and adjacent to the new building.

2. Access and egress will be provided by a new driveway along the east side to Mamalahoa Highway approximately 250 south of the existing driveway to the civic center across from Kamakani Street.

3. The proposed project will generate 42 inbound and 6 outbound trips during the morning peak hour. During the afternoon peak hour, the project will generate 19 inbound and 43 outbound trips.

4. The findings of the level-of-service analysis is that the eastbound approach of Kamakani Street to Mamalahoa Highway will operate at Level-of-Service E during the morning peak hour, which is the same as existing, and Level-of-Service D during the afternoon peak hour. All the remaining controlled lane groups will operate at Level-of-Service C, or better. Also, there are no changes in the level-of-service of any lane group as a result of project generated traffic except the westbound approach of Kinue Road at Mamalahoa where the level-of-service changes from Level-of-Service B to Level-of-Service C.

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[7] Institute of Traffic Engineers *Transportation Impact Analyses for Site Development, A Recommended Practice,* Washington, D.C., 2006, p 60.

5. As all controlled traffic movements except the eastbound approach of Kamakani Street, which is considered a minor or side street approach, will operate at Level-of-Service C, or better, no mitigation is recommended

Respectfully submitted,
PHILLIP ROWELL AND ASSOCIATES

Phillip J. Rowell, P.E.
Principal

List of Attachments

A. Project Location Map

B. Project Site Plan

C. Existing Peak Hour Traffic Volumes, Lane Configurations and Right-of-Way Control

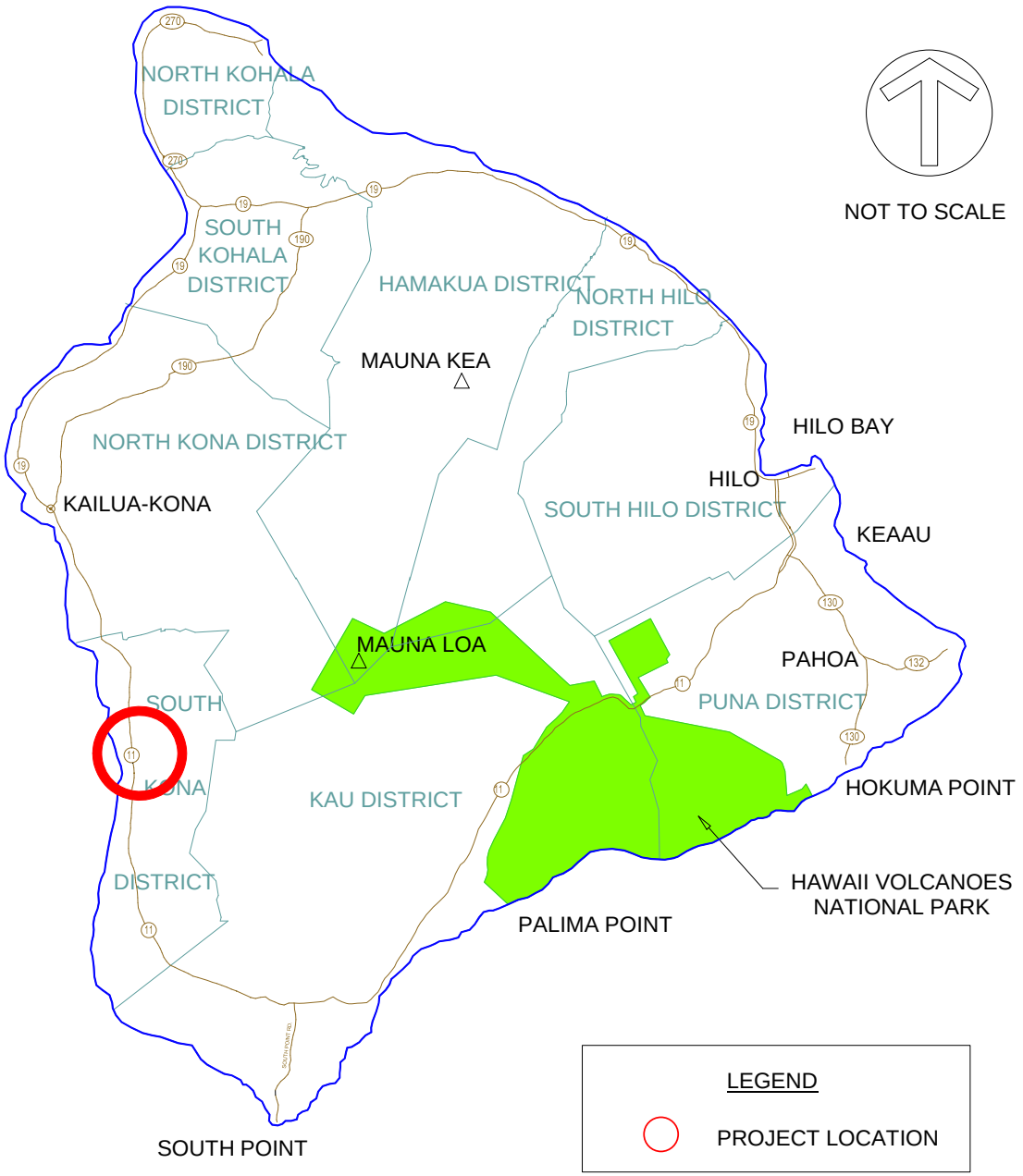
D. Background Growth and 2015 Background Peak Hour Traffic Projections

E. Project Trip Assignments

F. 2015 Background Plus Project Peak Hour Traffic Projections

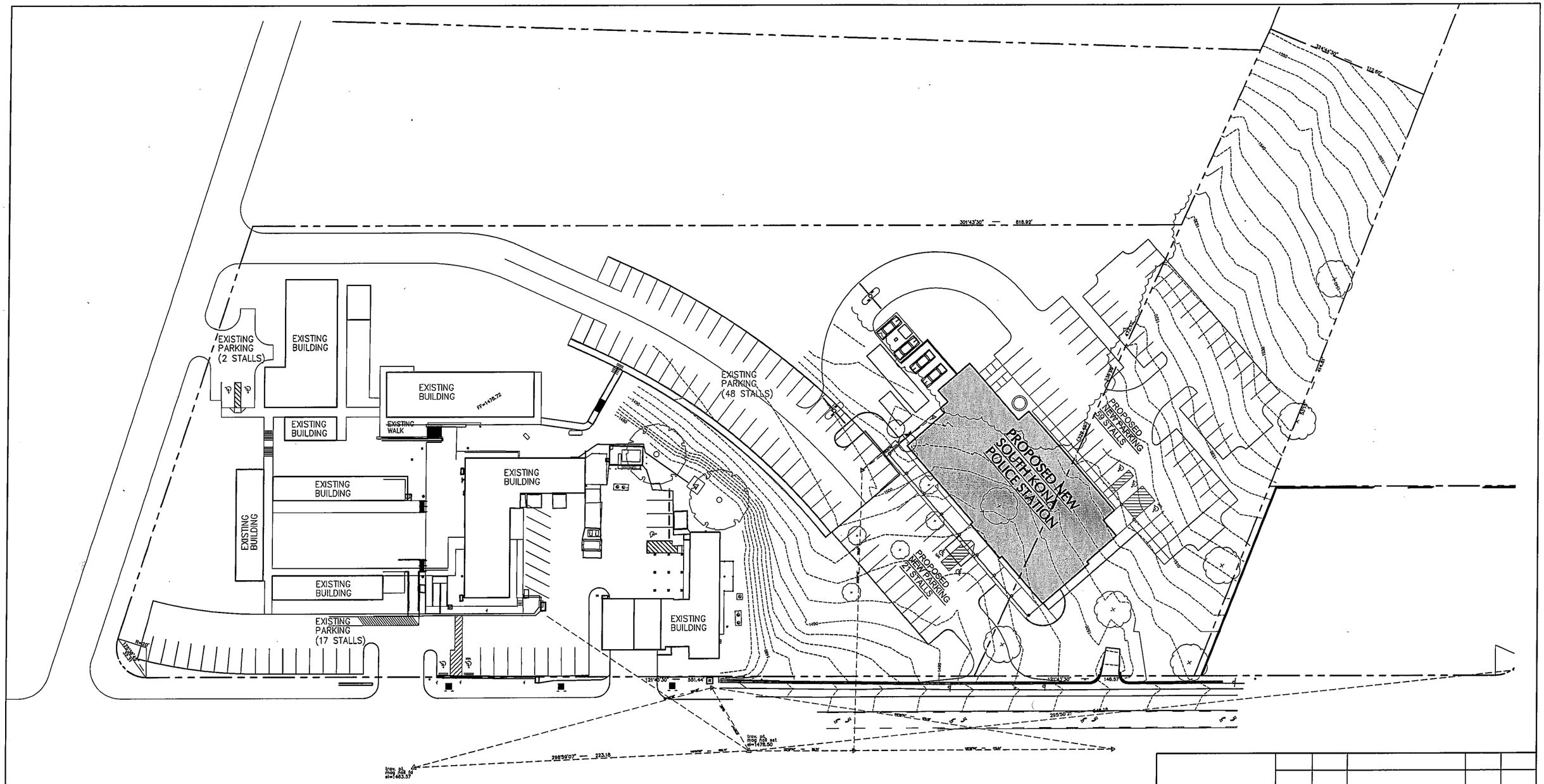
G. Traffic Projection Worksheet

H. Level-of-Service Calculation Worksheets



Attachment A
PROJECT LOCATION MAP

Attachment B
Project Site Plan



NORTH

1 PROPOSED SITE PLAN

SCALE: 1/32"=1'

0 16' 32'

SCALE IN FEET

REVISION:	DATE:	DESCRIPTION:	MADE BY:	APPROVED:

COUNTY OF HAWAII
DEPT. OF PUBLIC WORKS – BUILDING DIVISION

SOUTH KONA POLICE STATION

JOB NO. B-3676

MAMALAHOA HIGHWAY
CAPT. COOK, SOUTH KONA, HAWAII

T.M.K.: (3) 8-2-001: 072 & 084

JOB NO.: 09021

FLEMING & Associates, LLC
557 Manono Street
Hilo, Hawaii

PROPOSED SITE PLAN

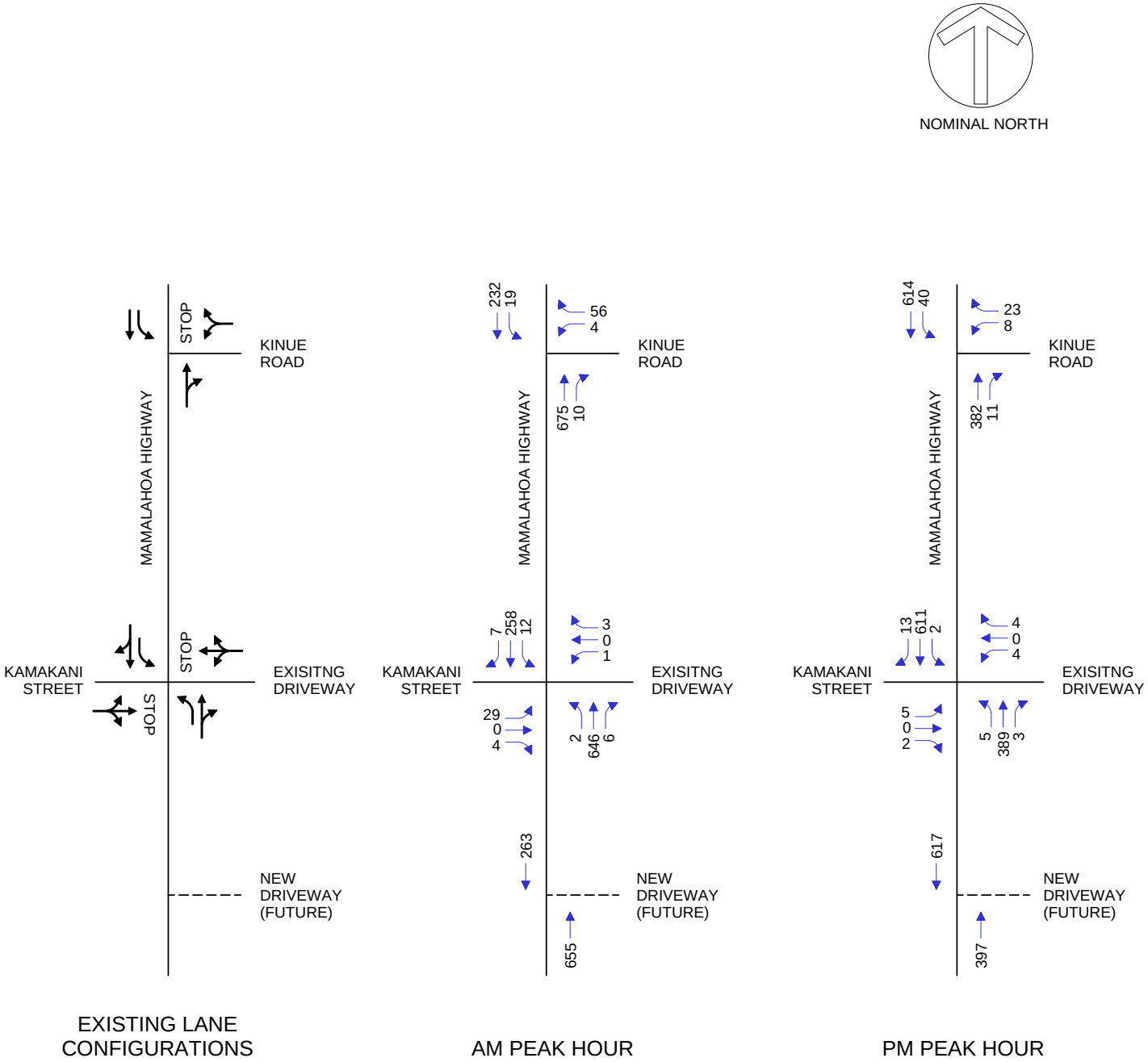
REVIEWED BY:

BUILDING DIVISION CHIEF
DEPT. OF PUBLIC WORKS
COUNTY OF HAWAII

DATE

DESIGNED BY: SF
DRAWN BY: SF
CHECKED BY: SF
DATE: 9-3-09

SHEET NO: A1

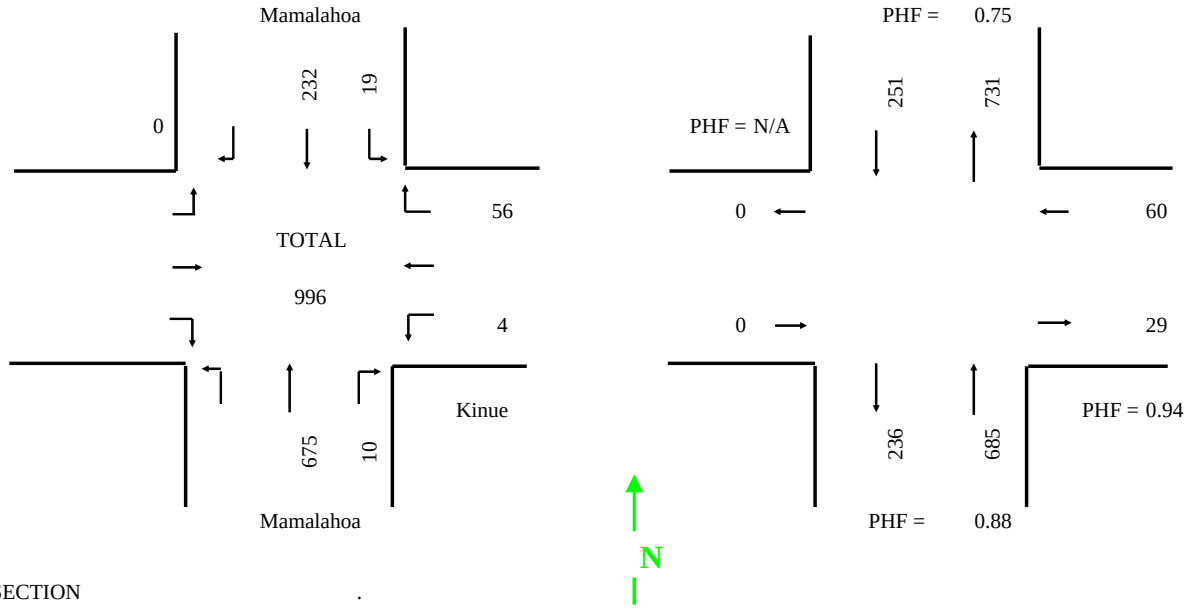


Attachment C
EXISTING PEAK HOUR TRAFFIC VOLUMES,
LANE CONFIGURATIONS AND RIGHT-OF-WAY CONTROLS

INTERSECTION TURNING MOVEMENT SUMMARY

INTERSECTION:	**Mamalahoa + Kinue**	**TIME:**	**6:30 AM to 8:30 AM**
JURISDICTION:		**DATE:**	**10-15-09, Thu**
PROJECT TITLE:		**PROJECT NO:**	

PEAK HOUR PERIOD: 6:45 AM to 7:45 AM
PEAK 15 MINUTE PERIO 7:15 AM to 7:30 AM



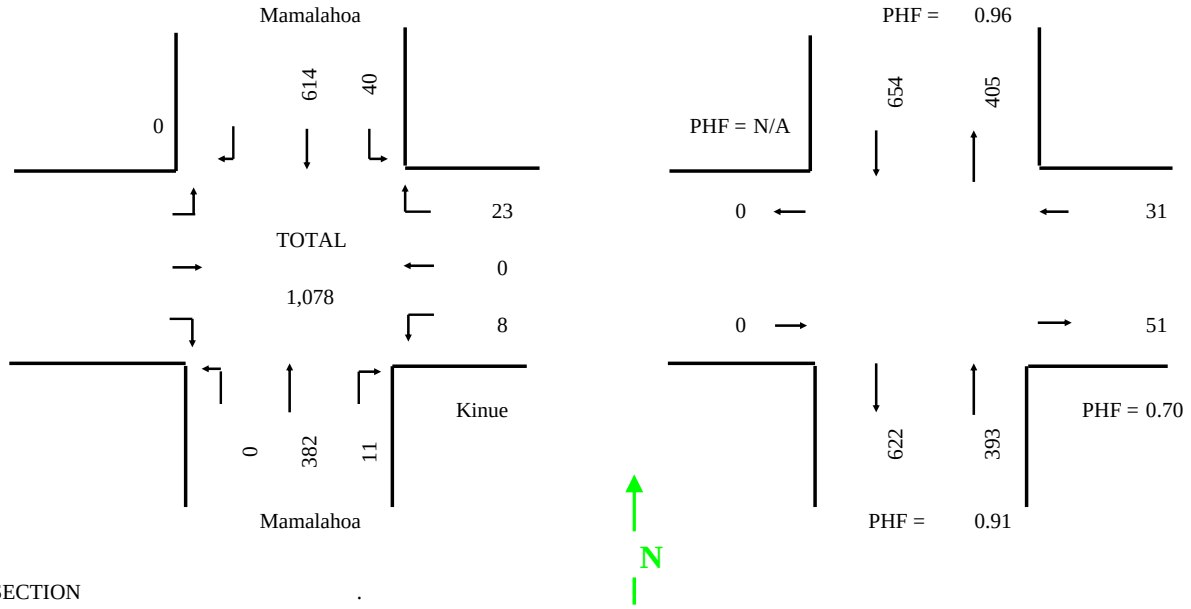
INTERSECTION .
PEAK HOUR FACTOR: 0.91

RUNNING COUNTS	Eastbound Left	Eastbound Thru	Eastbound Right	Kinue Westbound Left	Kinue Westbound Thru	Kinue Westbound Right	Mamalahoa Northbound Left	Mamalahoa Northbound Thru	Mamalahoa Northbound Right	Mamalahoa Southbound Left	Mamalahoa Southbound Thru	Mamalahoa Southbound Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
6:45 AM				2		8		150	1	7	34		202
7:00 AM				4		22		299	4	15	77		421
7:15 AM				4		38		480	5	19	123		669
7:30 AM				6		50		672	8	21	187		944
7:45 AM				6		64		825	11	26	266		1198
8:00 AM				8		71		934	13	33	335		1394
8:15 AM				10		79		1055	15	39	414		1612
8:30 AM				16		86		1162	16	41	485		1806
PERIOD COUNTS													
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
6:45 AM				2		8		150	1	7	34		202
7:00 AM				2		14		149	3	8	43		219
7:15 AM				0		16		181	1	4	46		248
7:30 AM				2		12		192	3	2	64		275
7:45 AM				0		14		153	3	5	79		254
8:00 AM				2		7		109	2	7	69		196
8:15 AM				2		8		121	2	6	79		218
8:30 AM				6		7		107	1	2	71		194
HOURLY TOTALS													
Beginning At	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
6:30 AM				6		50		672	8	21	187		944
6:45 AM				4		56		675	10	19	232		996
7:00 AM				4		49		635	9	18	258		973
7:15 AM				6		41		575	10	20	291		943
7:30 AM				10		36		490	8	20	298		862

INTERSECTION TURNING MOVEMENT SUMMARY

INTERSECTION:	**Mamalahoa + Kinue**	**TIME:**	**3:30 PM to 5:30 PM**
JURISDICTION:		**DATE:**	**10-15-09, Thu**
PROJECT TITLE:		**PROJECT NO:**	

PEAK HOUR PERIOD: 4:15 PM to 5:15 PM
PEAK 15 MINUTE PERIO 5:00 PM to 5:15 PM



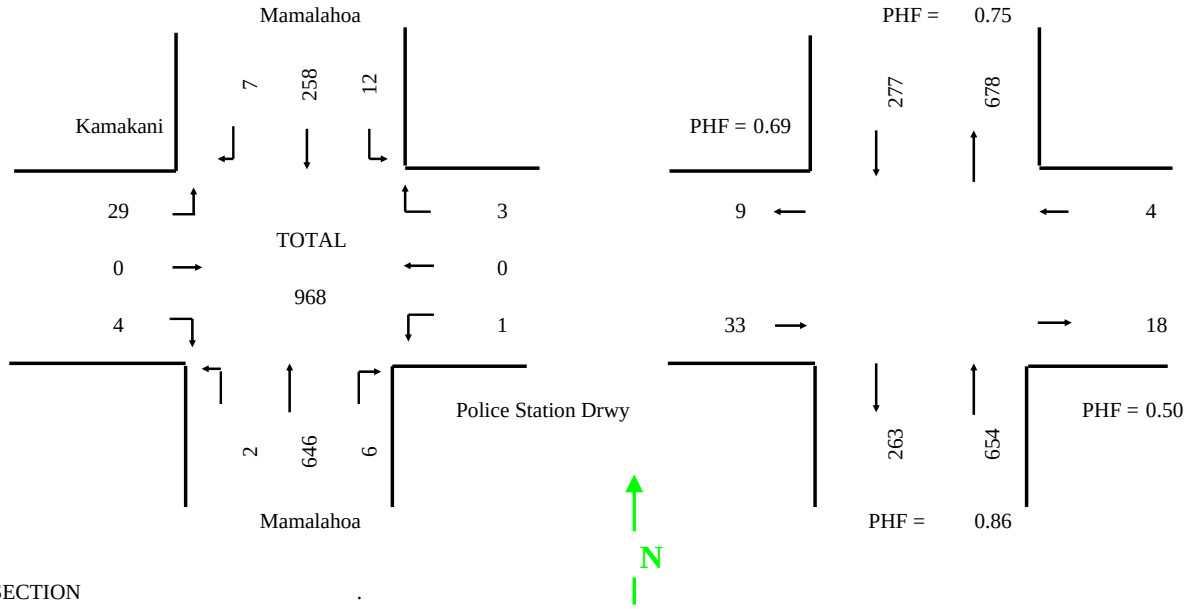
INTERSECTION .
PEAK HOUR FACTOR: 0.95

RUNNING COUNTS	Eastbound Left	Eastbound Thru	Eastbound Right	Kinue Westbound Left	Kinue Westbound Thru	Kinue Westbound Right	Mamalahoa Northbound Left	Mamalahoa Northbound Thru	Mamalahoa Northbound Right	Mamalahoa Southbound Left	Mamalahoa Southbound Thru	Mamalahoa Southbound Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
3:45 PM				3	0	9	0	88	6	4	166		276
4:00 PM				5	0	15	0	178	7	13	316		534
4:15 PM				9	0	24	0	267	11	26	460		797
4:30 PM				10	0	28	0	356	16	35	616		1061
4:45 PM				15	0	34	0	442	19	43	758		1311
5:00 PM				16	0	37	0	547	22	54	915		1591
5:15 PM				17	0	47	0	649	22	66	1074		1875
5:30 PM				19	0	57	0	738	22	76	1213		2125
PERIOD COUNTS													
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
3:45 PM				3	0	9	0	88	6	4	166		276
4:00 PM				2	0	6	0	90	1	9	150		258
4:15 PM				4	0	9	0	89	4	13	144		263
4:30 PM				1	0	4	0	89	5	9	156		264
4:45 PM				5	0	6	0	86	3	8	142		250
5:00 PM				1	0	3	0	105	3	11	157		280
5:15 PM				1	0	10	0	102	0	12	159		284
5:30 PM				2	0	10	0	89	0	10	139		250
HOURLY TOTALS													
Beginning At	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
3:30 PM				10	0	28	0	356	16	35	616		1061
3:45 PM				12	0	25	0	354	13	39	592		1035
4:00 PM				11	0	22	0	369	15	41	599		1057
4:15 PM				8	0	23	0	382	11	40	614		1078
4:30 PM				9	0	29	0	382	6	41	597		1064

INTERSECTION TURNING MOVEMENT SUMMARY

INTERSECTION:	**Mamalahoa + Kamakani**	**TIME:**	**6:30 AM to 8:30 AM**
JURISDICTION:		**DATE:**	**10-13-09, Tue**
PROJECT TITLE:		**PROJECT NO:**	

PEAK HOUR PERIOD: 7:00 AM to 8:00 AM
PEAK 15 MINUTE PERIO 7:15 AM to 7:30 AM



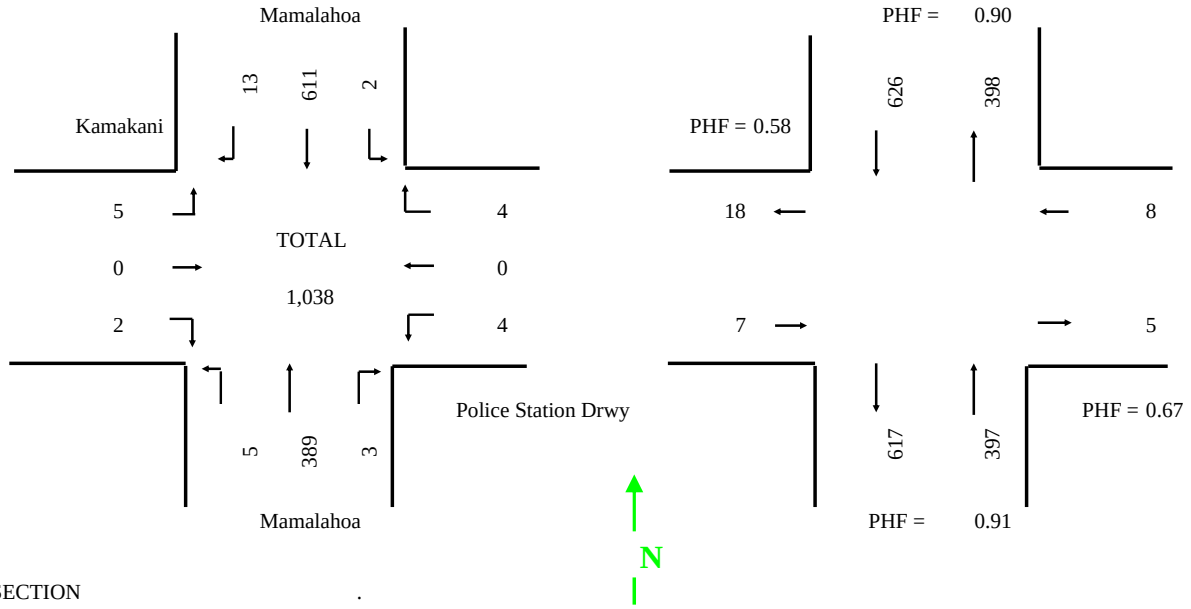
INTERSECTION .
PEAK HOUR FACTOR: 0.91

RUNNING COUNTS	Kamakani Eastbound Left	Thru	Right	Police Station Drwy Westbound Left	Thru	Right	Mamalahoa Northbound Left	Thru	Right	Mamalahoa Southbound Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
6:45 AM	4	0	0	0	0	2	0	133	1	0	38	1	179
7:00 AM	10	1	0	0	0	3	0	285	2	0	77	2	380
7:15 AM	20	1	0	0	0	4	0	474	3	0	123	4	629
7:30 AM	30	1	2	0	0	4	1	649	4	4	195	4	894
7:45 AM	35	1	3	0	0	5	2	801	7	5	253	6	1118
8:00 AM	39	1	4	1	0	6	2	931	8	12	335	9	1348
8:15 AM	39	1	4	1	0	9	2	1035	9	13	412	9	1534
8:30 AM	42	1	4	2	0	11	2	1142	9	13	479	11	1716
PERIOD COUNTS													
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
6:45 AM	4	0	0	0	0	2	0	133	1	0	38	1	179
7:00 AM	6	1	0	0	0	1	0	152	1	0	39	1	201
7:15 AM	10	0	0	0	0	1	0	189	1	0	46	2	249
7:30 AM	10	0	2	0	0	0	1	175	1	4	72	0	265
7:45 AM	5	0	1	0	0	1	1	152	3	1	58	2	224
8:00 AM	4	0	1	1	0	1	0	130	1	7	82	3	230
8:15 AM	0	0	0	0	0	3	0	104	1	1	77	0	186
8:30 AM	3	0	0	1	0	2	0	107	0	0	67	2	182
HOURLY TOTALS													
Beginning At	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
6:30 AM	30	1	2	0	0	4	1	649	4	4	195	4	894
6:45 AM	31	1	3	0	0	3	2	668	6	5	215	5	939
7:00 AM	29	0	4	1	0	3	2	646	6	12	258	7	968
7:15 AM	19	0	4	1	0	5	2	561	6	13	289	5	905
7:30 AM	12	0	2	2	0	7	1	493	5	9	284	7	822

INTERSECTION TURNING MOVEMENT SUMMARY

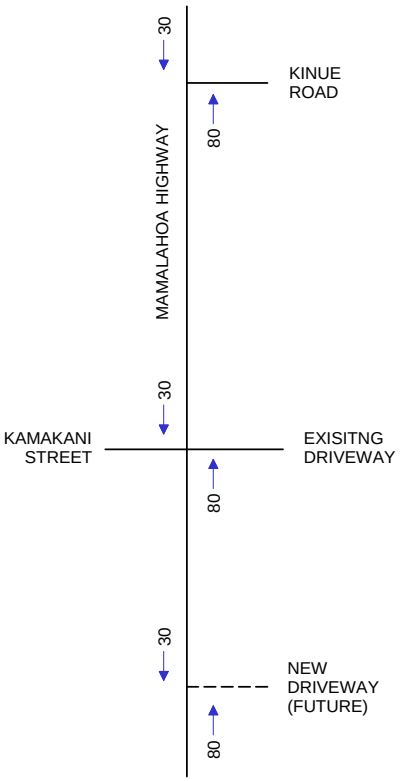
INTERSECTION:	**Mamalahoa + Kamakani**	**TIME:**	**3:30 PM to 5:30 PM**
JURISDICTION:		**DATE:**	**10-13-09, Tue**
PROJECT TITLE:		**PROJECT NO:**	

PEAK HOUR PERIOD: 3:30 PM to 4:30 PM
PEAK 15 MINUTE PERIO 4:00 PM to 4:15 PM

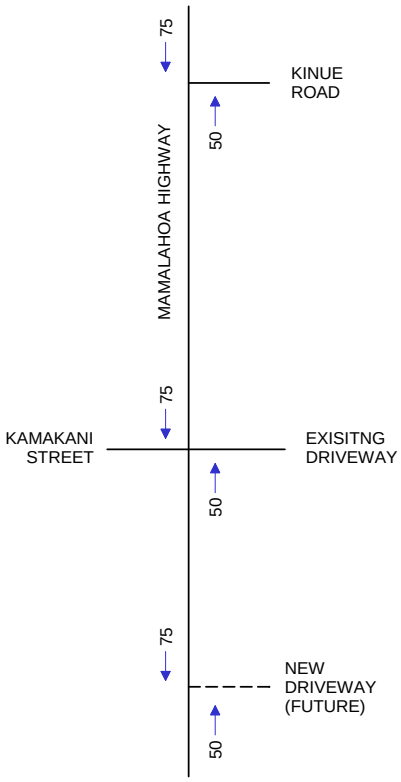


INTERSECTION .
PEAK HOUR FACTOR: 0.91

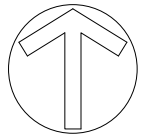
RUNNING COUNTS	Kamakani Eastbound Left	Thru	Right	Police Station Drwy Westbound Left	Thru	Right	Mamalahoa Northbound Left	Thru	Right	Mamalahoa Southbound Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
3:45 PM	1	0	0	2	0	1	0	91	1	1	154	4	255
4:00 PM	2	0	1	3	0	3	1	198	2	2	295	6	513
4:15 PM	4	0	2	3	0	3	4	302	2	2	465	10	797
4:30 PM	5	0	2	4	0	4	5	389	3	2	611	13	1038
4:45 PM	8	0	2	4	0	4	7	463	4	2	771	20	1285
5:00 PM	9	0	3	4	0	5	7	555	4	3	918	27	1535
5:15 PM	15	0	3	4	0	5	7	633	4	3	1087	31	1792
5:30 PM	16	0	4	4	0	6	11	711	4	4	1234	36	2030
PERIOD COUNTS													
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
3:45 PM	1	0	0	2	0	1	0	91	1	1	154	4	255
4:00 PM	1	0	1	1	0	2	1	107	1	1	141	2	258
4:15 PM	2	0	1	0	0	0	3	104	0	0	170	4	284
4:30 PM	1	0	0	1	0	1	1	87	1	0	146	3	241
4:45 PM	3	0	0	0	0	0	2	74	1	0	160	7	247
5:00 PM	1	0	1	0	0	1	0	92	0	1	147	7	250
5:15 PM	6	0	0	0	0	0	0	78	0	0	169	4	257
5:30 PM	1	0	1	0	0	1	4	78	0	1	147	5	238
HOURLY TOTALS													
Beginning At	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
3:30 PM	5	0	2	4	0	4	5	389	3	2	611	13	1038
3:45 PM	7	0	2	2	0	3	7	372	3	1	617	16	1030
4:00 PM	7	0	2	1	0	2	6	357	2	1	623	21	1022
4:15 PM	11	0	1	1	0	2	3	331	2	1	622	21	995
4:30 PM	11	0	2	0	0	2	6	322	1	2	623	23	992



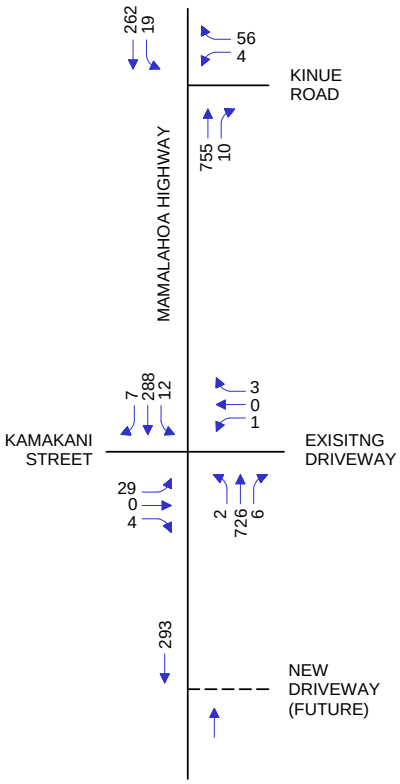
AM PEAK HOUR
BACKGROUND GROWTH



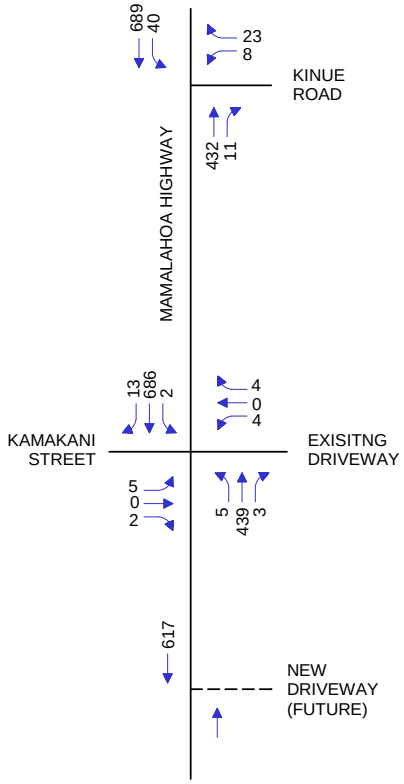
PM PEAK HOUR
BACKGROUND GROWTH



NOMINAL NORTH

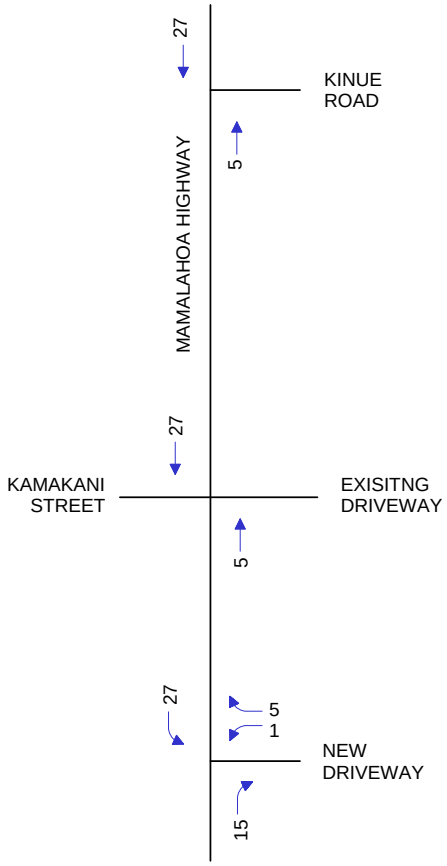


AM PEAK HOUR
PROJECTIONS

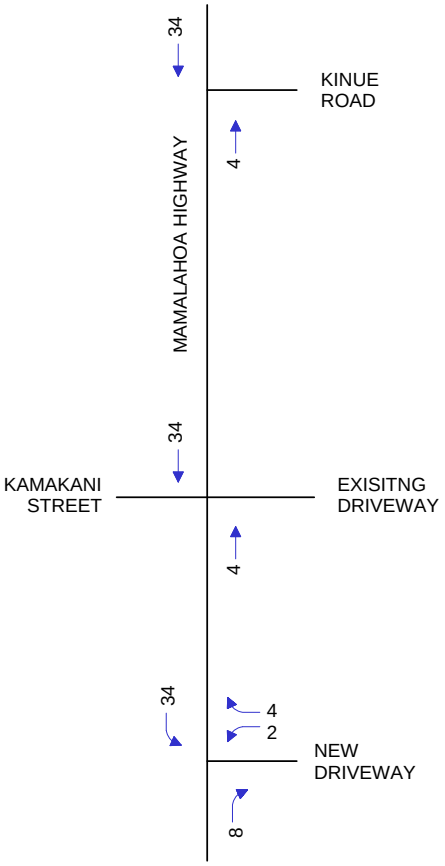


PM PEAK HOUR
PROJECTIONS

Attachment D
BACKGROUND TRAFFIC GROWTH AND
2015 BACKGROUND PEAK HOUR TRAFFIC PROJECTIONS

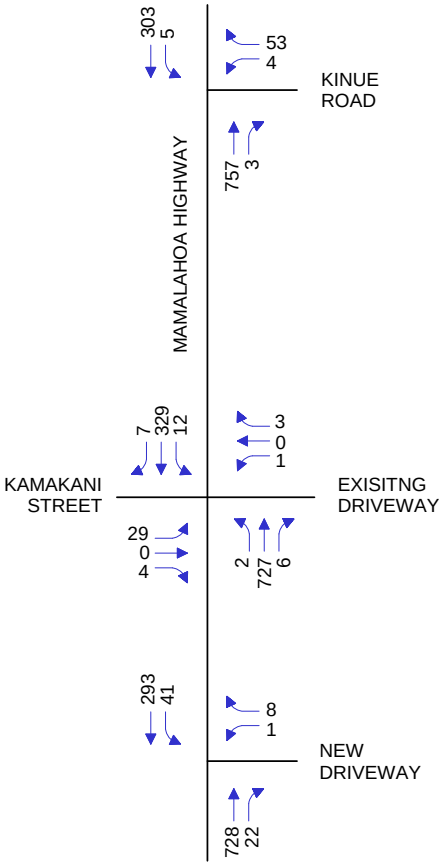


AM PEAK HOUR

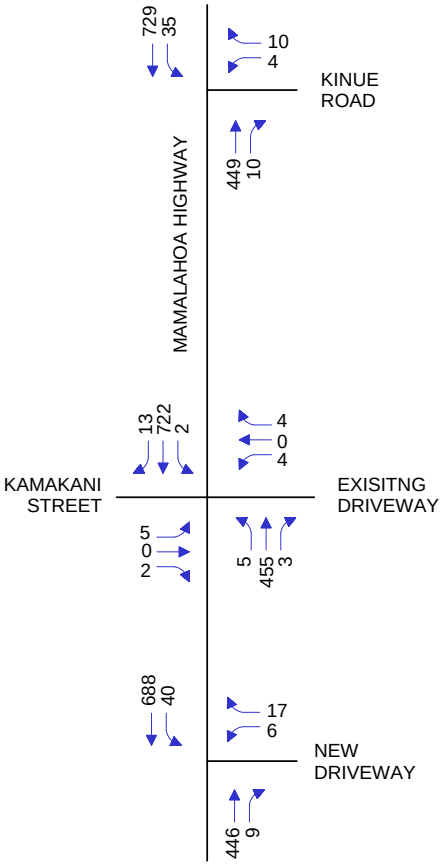


PM PEAK HOUR

Attachment E
PROJECT TRIP ASSIGNMENTS



AM PEAK HOUR



PM PEAK HOUR

Attachment F
2015 BACKGROUND PLUS PROJECT PEAK HOUR PROJECTIONS

Attachment G
Traffic Projection Worksheet

TRAFFIC PROJECTION WORKSHEET
South Kona Police Station
January 2010

1 Mamalahoa Highway at Kinue Road

		Existing (2009)		2009 to 2015 Growth		2015 Baclground		Project Trips		2015 Bkgrd + Project		Adjustment for Existing Parking Lot		Adjusted 2015 Bkgrd + Project	
App	Mvt	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
No	Rt					0	0			0	0			0	0
	Th	232	614	30	75	262	689	27	34	289	723	14	6	303	729
	Lt	19	40			19	40			19	40	-14	-6	5	34
East	Rt	56	23			56	23			56	23	-3	-13	53	10
	Th					0	0			0	0			0	0
	Lt	4	8			4	8			4	8		-4	4	4
So	Rt	10	11			10	11			10	11	-7	-1	3	10
	Th	675	382	80	50	755	432	5	4	760	436	-3	13	757	449
	Lt					0	0			0	0			0	0
West	Rt					0	0			0	0			0	0
	Th					0	0			0	0			0	0
	Lt					0	0			0	0			0	0
TOTALS		996	1078	110	125	1106	1203	32	38	1138	1241	-13	-5	1125	1236

2 Mamalahoa Highway at Kamakani Street/Existing Driveway

		Existing (2009)		2009 to 2015 Growth		2015 Baclground		Project Trips		2015 Bkgrd + Project		Adjustment for Existing Parking Lot		Adjusted 2015 Bkgrd + Project	
App	Mvt	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
No	Rt	7	13			7	13			7	13			7	13
	Th	258	611	30	75	288	686	27	34	315	720	14	2	329	722
	Lt	12	2			12	2			12	2			12	2
East	Rt	3	4			3	4			3	4			3	4
	Th					0	0			0	0			0	0
	Lt	1	4			1	4			1	4			1	4
So	Rt	6	3			6	3			6	3			6	3
	Th	646	389	80	50	726	439	5	4	731	443	-4	12	727	455
	Lt	2	5			2	5			2	5			2	5
West	Rt	4	2			4	2			4	2			4	2
	Th					0	0			0	0			0	0
	Lt	29	5			29	5			29	5			29	5
TOTALS		968	1038	110	125	1078	1163	32	38	1110	1201	10	14	1120	1215

3 Mamalahoa Highway at Proposed New Driveway

		Existing (2009)		2009 to 2015 Growth		2015 Baclground		Project Trips		2015 Bkgrd + Project		Adjustment for Existing Parking Lot		Adjusted 2015 Bkgrd + Project	
App	Mvt	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
No	Rt					0	0			0	0			0	0
	Th	263	617	30	75	293	692			293	692		-4	293	688
	Lt					0	0	27	34	27	34	14	6	41	40
East	Rt					0	0	5	4	5	4	3	13	8	17
	Th					0	0			0	0			0	0
	Lt					0	0	1	2	1	2		4	1	6
So	Rt					0	0	15	8	15	8	7	1	22	9
	Th	655	397	80	50	735	447			735	447	-7	-1	728	446
	Lt					0	0			0	0			0	0
West	Rt					0	0			0	0			0	0
	Th					0	0			0	0			0	0

Attachment H
Level-of-Service Calculation Worksheets

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	4	56	675	10	19	232
Peak Hour Factor	0.50	0.88	0.88	0.83	0.60	0.73
Hourly flow rate (vph)	8	64	767	12	32	318
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1154	773			779	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1154	773			779	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	84			96	
cM capacity (veh/h)	207	394			825	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	72	779	32	318
Volume Left	8	0	32	0
Volume Right	64	12	0	0
cSH	358	1700	825	1700
Volume to Capacity	0.20	0.46	0.04	0.19
Queue Length (ft)	18	0	3	0
Control Delay (s)	17.6	0.0	9.5	0.0
Lane LOS	C		A	
Approach Delay (s)	17.6	0.0	0.9	
Approach LOS	C			

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: KAMAKANI ST & MAMALAHOA HWY

1/5/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	29	0	4	1	0	3	2	646	6	12	258	7
Peak Hour Factor	0.72	0.92	0.50	0.25	0.92	0.75	0.50	0.85	0.50	0.43	0.90	0.58
Hourly flow rate (vph)	40	0	8	4	0	4	4	760	12	28	287	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1121	1129	293	1124	1129	766	299			772		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1121	1129	293	1124	1129	766	299			772		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	77	100	99	98	100	99	100			97		
cM capacity (veh/h)	174	194	739	173	194	398	1246			830		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	48	8	4	772	28	299
Volume Left	40	4	4	0	28	0
Volume Right	8	4	0	12	0	12
cSH	200	241	1246	1700	830	1700
Volume to Capacity	0.24	0.03	0.00	0.45	0.03	0.18
Queue Length (ft)	23	3	0	0	3	0
Control Delay (s)	28.7	20.4	7.9	0.0	9.5	0.0
Lane LOS	D	C	A		A	
Approach Delay (s)	28.7	20.4	0.0		0.8	
Approach LOS	D	C				

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	8	23	382	11	40	614
Peak Hour Factor	0.58	0.40	0.91	0.55	0.83	0.97
Hourly flow rate (vph)	14	58	420	20	48	633
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1159	430			440	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1159	430			440	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	91			96	
cM capacity (veh/h)	204	619			1104	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	71	440	48	633
Volume Left	14	0	48	0
Volume Right	58	20	0	0
cSH	444	1700	1104	1700
Volume to Capacity	0.16	0.26	0.04	0.37
Queue Length (ft)	14	0	3	0
Control Delay (s)	14.6	0.0	8.4	0.0
Lane LOS	B		A	
Approach Delay (s)	14.6	0.0	0.6	
Approach LOS	B			

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: KAMAKANI ST & MAMALAHOA HWY

1/5/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	0	2	4	0	4	5	389	3	2	611	13
Peak Hour Factor	0.62	0.25	0.50	0.50	0.92	0.50	0.67	0.97	0.75	0.25	0.90	0.81
Hourly flow rate (vph)	8	0	4	8	0	8	7	401	4	8	679	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1127	1123	687	1117	1129	403	695			405		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1127	1123	687	1117	1129	403	695			405		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	99	96	100	99	99			99		
cM capacity (veh/h)	175	200	442	178	198	641	887			1138		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	16	7	405	8	695
Volume Left	8	8	7	0	8	0
Volume Right	4	8	0	4	0	16
cSH	219	279	887	1700	1138	1700
Volume to Capacity	0.06	0.06	0.01	0.24	0.01	0.41
Queue Length (ft)	4	5	1	0	1	0
Control Delay (s)	22.4	18.7	9.1	0.0	8.2	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	22.4	18.7	0.2		0.1	
Approach LOS	C	C				

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: KINUE ST & MAMALAHOA HWY

1/5/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	4	56	755	10	19	262
Peak Hour Factor	0.50	0.88	0.88	0.83	0.60	0.73
Hourly flow rate (vph)	8	64	858	12	32	359
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1286	864			870	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1286	864			870	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	82			96	
cM capacity (veh/h)	171	349			762	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	72	870	32	359
Volume Left	8	0	32	0
Volume Right	64	12	0	0
cSH	313	1700	762	1700
Volume to Capacity	0.23	0.51	0.04	0.21
Queue Length (ft)	22	0	3	0
Control Delay (s)	19.9	0.0	9.9	0.0
Lane LOS	C		A	
Approach Delay (s)	19.9	0.0	0.8	
Approach LOS	C			

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: KAMAKANI ST & MAMALAHOA HWY

1/5/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	29	0	4	1	0	3	2	726	6	12	288	7
Peak Hour Factor	0.72	0.92	0.50	0.25	0.92	0.75	0.50	0.85	0.50	0.43	0.90	0.58
Hourly flow rate (vph)	40	0	8	4	0	4	4	854	12	28	320	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1248	1256	326	1252	1256	860	332			866		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1248	1256	326	1252	1256	860	332			866		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	72	100	99	97	100	99	100			96		
cM capacity (veh/h)	142	162	708	141	162	351	1211			765		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	48	8	4	866	28	332
Volume Left	40	4	4	0	28	0
Volume Right	8	4	0	12	0	12
cSH	163	201	1211	1700	765	1700
Volume to Capacity	0.30	0.04	0.00	0.51	0.04	0.20
Queue Length (ft)	29	3	0	0	3	0
Control Delay (s)	36.0	23.6	8.0	0.0	9.9	0.0
Lane LOS	E	C	A		A	
Approach Delay (s)	36.0	23.6	0.0		0.8	
Approach LOS	E	C				

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	8	23	432	11	40	689
Peak Hour Factor	0.58	0.40	0.91	0.55	0.83	0.97
Hourly flow rate (vph)	14	58	475	20	48	710
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1291	485			495	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1291	485			495	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	90			95	
cM capacity (veh/h)	169	576			1054	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	71	495	48	710
Volume Left	14	0	48	0
Volume Right	58	20	0	0
cSH	393	1700	1054	1700
Volume to Capacity	0.18	0.29	0.05	0.42
Queue Length (ft)	16	0	4	0
Control Delay (s)	16.2	0.0	8.6	0.0
Lane LOS	C		A	
Approach Delay (s)	16.2	0.0	0.5	
Approach LOS	C			

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: KAMAKANI ST & MAMALAHOA HWY

1/5/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	0	2	4	0	4	5	439	3	2	686	13
Peak Hour Factor	0.62	0.25	0.50	0.50	0.92	0.50	0.67	0.97	0.75	0.25	0.90	0.81
Hourly flow rate (vph)	8	0	4	8	0	8	7	453	4	8	762	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1262	1258	770	1252	1264	455	778			457		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1262	1258	770	1252	1264	455	778			457		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	99	94	100	99	99			99		
cM capacity (veh/h)	141	166	396	144	164	599	825			1089		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	16	7	457	8	778
Volume Left	8	8	7	0	8	0
Volume Right	4	8	0	4	0	16
cSH	179	232	825	1700	1089	1700
Volume to Capacity	0.07	0.07	0.01	0.27	0.01	0.46
Queue Length (ft)	5	6	1	0	1	0
Control Delay (s)	26.5	21.7	9.4	0.0	8.3	0.0
Lane LOS	D	C	A		A	
Approach Delay (s)	26.5	21.7	0.2		0.1	
Approach LOS	D	C				

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	4	53	757	3	5	303
Peak Hour Factor	0.50	0.88	0.88	0.83	0.60	0.73
Hourly flow rate (vph)	8	60	860	4	8	415
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1294	862			864	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1294	862			864	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	83			99	
cM capacity (veh/h)	175	350			766	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	68	864	8	415
Volume Left	8	0	8	0
Volume Right	60	4	0	0
cSH	313	1700	766	1700
Volume to Capacity	0.22	0.51	0.01	0.24
Queue Length (ft)	20	0	1	0
Control Delay (s)	19.7	0.0	9.8	0.0
Lane LOS	C		A	
Approach Delay (s)	19.7	0.0	0.2	
Approach LOS	C			

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: KAMAKANI ST & MAMALAHOA HWY

1/6/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	29	0	4	1	0	3	2	727	6	12	329	7
Peak Hour Factor	0.72	0.92	0.50	0.25	0.92	0.75	0.50	0.85	0.50	0.43	0.90	0.58
Hourly flow rate (vph)	40	0	8	4	0	4	4	855	12	28	366	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1295	1303	372	1299	1303	861	378			867		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1295	1303	372	1299	1303	861	378			867		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	69	100	99	97	100	99	100			96		
cM capacity (veh/h)	132	152	668	131	152	351	1165			764		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	48	8	4	867	28	378
Volume Left	40	4	4	0	28	0
Volume Right	8	4	0	12	0	12
cSH	152	190	1165	1700	764	1700
Volume to Capacity	0.32	0.04	0.00	0.51	0.04	0.22
Queue Length (ft)	32	3	0	0	3	0
Control Delay (s)	39.4	24.7	8.1	0.0	9.9	0.0
Lane LOS	E	C	A		A	
Approach Delay (s)	39.4	24.7	0.0		0.7	
Approach LOS	E	C				

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: NEW DRIVEWAY & MAMALAHOA HWY

1/6/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	8	728	22	41	293
Peak Hour Factor	0.50	0.50	0.85	0.50	0.50	0.90
Hourly flow rate (vph)	2	16	856	44	82	326
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	1					
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1368	878			900	
vC1, stage 1 conf vol	878					
vC2, stage 2 conf vol	490					
vCu, unblocked vol	1368	878			900	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	95			89	
cM capacity (veh/h)	273	343			742	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	18	900	82	326
Volume Left	2	0	82	0
Volume Right	16	44	0	0
cSH	333	1700	742	1700
Volume to Capacity	0.05	0.53	0.11	0.19
Queue Length (ft)	4	0	9	0
Control Delay (s)	16.4	0.0	10.5	0.0
Lane LOS	C		B	
Approach Delay (s)	16.4	0.0	2.1	
Approach LOS	C			

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	4	10	449	10	34	729
Peak Hour Factor	0.58	0.40	0.91	0.55	0.83	0.97
Hourly flow rate (vph)	7	25	493	18	41	752
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1336	502			512	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1336	502			512	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	96			96	
cM capacity (veh/h)	160	563			1038	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	32	512	41	752
Volume Left	7	0	41	0
Volume Right	25	18	0	0
cSH	365	1700	1038	1700
Volume to Capacity	0.09	0.30	0.04	0.44
Queue Length (ft)	7	0	3	0
Control Delay (s)	15.8	0.0	8.6	0.0
Lane LOS	C		A	
Approach Delay (s)	15.8	0.0	0.4	
Approach LOS	C			

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: KAMAKANI ST & MAMALAHOA HWY

1/5/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	0	2	4	0	4	5	455	3	2	722	13
Peak Hour Factor	0.62	0.25	0.50	0.50	0.92	0.50	0.67	0.97	0.75	0.25	0.90	0.81
Hourly flow rate (vph)	8	0	4	8	0	8	7	469	4	8	802	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								250			363	
pX, platoon unblocked												
vC, conflicting volume	1318	1314	810	1308	1320	471	818			473		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1318	1314	810	1308	1320	471	818			473		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	99	94	100	99	99			99		
cM capacity (veh/h)	129	153	375	131	152	587	797			1073		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	16	7	473	8	818
Volume Left	8	8	7	0	8	0
Volume Right	4	8	0	4	0	16
cSH	165	215	797	1700	1073	1700
Volume to Capacity	0.07	0.07	0.01	0.28	0.01	0.48
Queue Length (ft)	6	6	1	0	1	0
Control Delay (s)	28.6	23.1	9.6	0.0	8.4	0.0
Lane LOS	D	C	A		A	
Approach Delay (s)	28.6	23.1	0.1		0.1	
Approach LOS	D	C				

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: NEW DRIVEWAY & MAMALAHOA HWY

1/5/2010

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	6	17	446	9	40	688
Peak Hour Factor	0.50	0.50	0.90	0.50	0.50	0.91
Hourly flow rate (vph)	12	34	496	18	80	756
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	1					
Upstream signal (ft)						613
pX, platoon unblocked						
vC, conflicting volume	1421	505			514	
vC1, stage 1 conf vol	505					
vC2, stage 2 conf vol	916					
vCu, unblocked vol	1421	505			514	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	94			92	
cM capacity (veh/h)	260	561			1037	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	46	514	80	756
Volume Left	12	0	80	0
Volume Right	34	18	0	0
cSH	431	1700	1037	1700
Volume to Capacity	0.11	0.30	0.08	0.44
Queue Length (ft)	9	0	6	0
Control Delay (s)	14.3	0.0	8.8	0.0
Lane LOS	B		A	
Approach Delay (s)	14.3	0.0	0.8	
Approach LOS	B			

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		